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PEAVEY®

DPM® V3 Owner's Manual

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Chapter 1 — Introduction

Congratulations on your purchase of the DPM® V3. Peavey's engineers have taken the award-winning technology of their DPM® 3 synthesizer, shrunk it into a single rack space, and added some new features, too.

The DPM V3 will give you many years of enjoyment, not just because of the features it offers today, but because it uses general purpose Digital Signal Processing (DSP) chips to perform all sound generation and modification. Because the DPM V3 doesn't take the traditional approach of using custom chips dedicated to a particular type of sound generation, it can be reprogrammed via software updates to provide alternate types of sound generation. Furthermore, new sound programs and wavesamples can be loaded in to increase the DPM V3's existing capabilities.

Highlights of the current configuration include:

- 300 programs available at all times: two on-board banks of 100 fully editable programs, and 100 programs from an optional RAM (user-editable) or ROM (preset, non-editable) cartridge.
- Multi-timbral MIDI operation so that a single DPM V3 can provide up to 16 different sounds simultaneously.
- 16 voice, dual oscillator operation — play up to 32 notes simultaneously on 16 keys.
- Three individual stereo outputs.
- Optional non-volatile memory for storing new wavesamples (expandable up to 1 Megabyte).
- Four Megabytes of 16-bit PCM wavesamples, including both acoustic and electronic instrument sounds (same as the DPM 3).
- Two on-board programmable digital signal processors (reverb, EQ, chorus, delay, etc.) means you may not need to bring outboard signal processors with you to the gig.
- Alternate tuning tables.

. . . and much more, which you'll find out about as you read this manual.

Before doing anything else, send in your warranty registration. This will allow Peavey to advise you of any future updates that enhance the unit's operation.

1.1 ABOUT THIS MANUAL

This manual is divided into seven main chapters:

- **Introduction.** This section shows you how to make some great sounds right out of the box.
- **Modifying existing setups and sounds.** After you become familiar with the DPM V3, you may want to change some of the most-used parameters such as pitch wheel bend range or various MIDI parameters. This section covers the most

important programming options. The first two chapters will be the only information some musicians will need.

- **Programming the DPM V3.** For those who want to create their own sounds, this presents the basics of sound programming as well as a reference section of all the available programming parameters.
- **Programming the signal processors.** This includes details on programming the on-board signal processors so that you can optimize your sounds.
- **Programming drum kits.** The DPM V3 offers a full complement of drum sounds and can serve as a drum expander module for sequencers.
- **Advanced applications.** This offers information on making the best use of the multiple outputs, loading samples into the DPM V3, advanced programming techniques, and more.
- **MIDI supplement.** It is important to know the basics of the MIDI specification to make the best use of the DPM V3's MIDI features. If you are not very familiar with MIDI, please read the MIDI supplement before proceeding.

1.2 TUTORIAL AND SETUP: ON THE AIR IN 15 MINUTES WITH THE DPM V3

1.2a Cable Setup

1. Unpack the DPM V3. Save all packing materials in case the unit needs to be sent for updating or servicing.
2. Plug the female end of the line cord into the matching socket on the rear of the DPM V3.
3. With *all devices in your system turned off* and the volume controls turned down, hook up the outputs according to your particular needs, as described below.

1.2b I Just Wanna' Hear the Demo!

1. Run a mono cord from either the left or right Main output to your amplifier, or connect two mono cords from the left and right Main outputs to a stereo amp or two mixer inputs.
2. Turn on (in this order) the DPM V3, mixer (if present), and amplification system. Turn the volume controls up part way; turn them up to normal volume once you're satisfied that the system is working properly.
3. Press the GLOBL button (toward the lower left corner) once.
4. Press and hold the +/INC button until the display stops changing.
5. The display says DEMO Sequence START. Press the EXEC button to start the sequence.
6. Press the EXEC button again to stop the sequence.

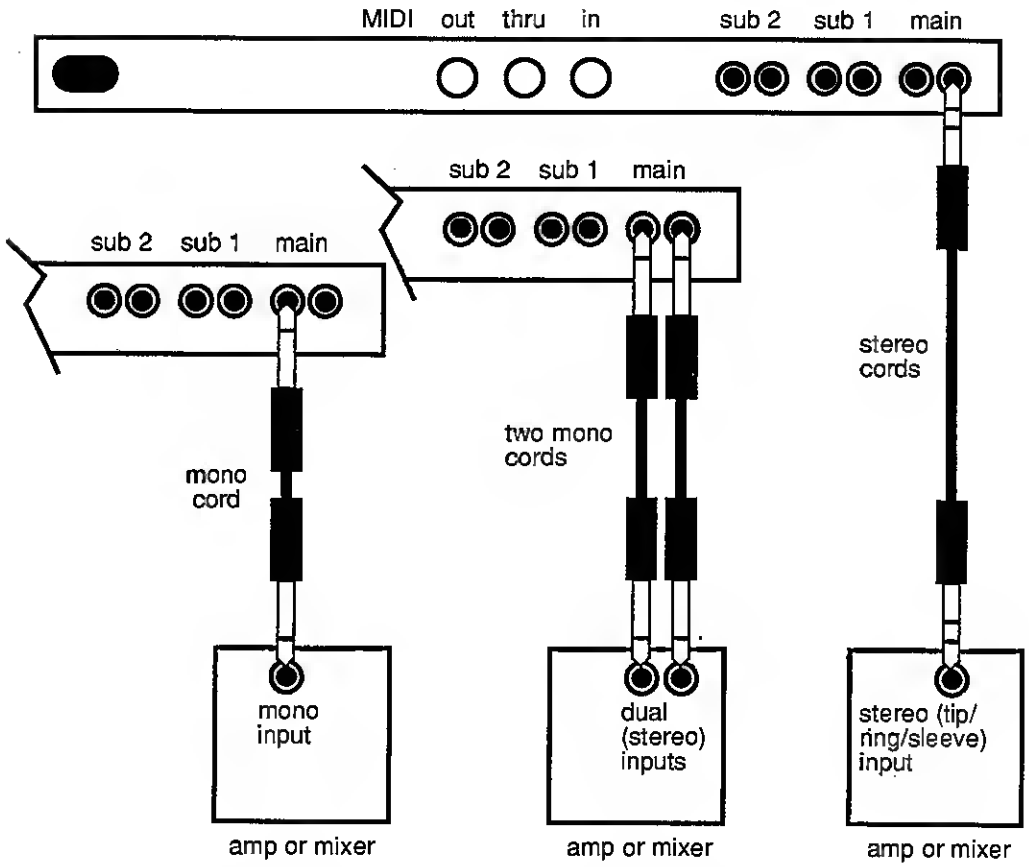
1.2c Live Use with a MIDI Keyboard or Other Controller

Most live applications involve stereo or mono outputs and a master MIDI keyboard or other MIDI controller (MIDI guitar, drums, etc.). The keyboard will usually send data in poly mode (all data is sent over one channel). Refer

to the MIDI supplement if you are confused about the difference between individual MIDI modes.

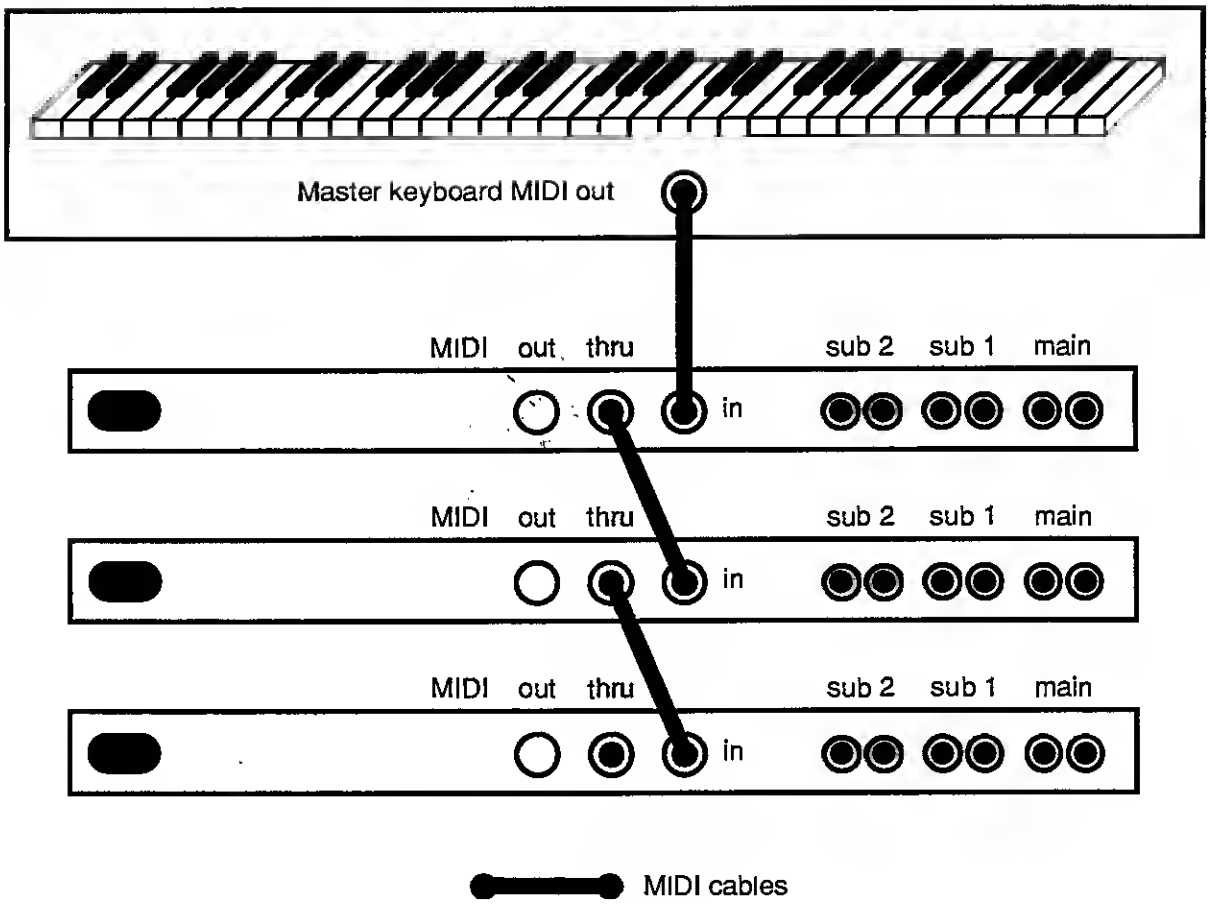
Audio: Referring to the figure below, plug the Main left and right outputs into a suitable amplification system or mixer. You have three main options, one mono and two stereo.

- Option 1 Mono Run: a mono cord from either the left or right Main output to your amplifier.
- Option 2 Stereo: Connect two mono cords from the left and right Main outputs to a stereo amp or two mixer inputs. If you need a keyboard mixer, Peavey makes the PLM™ 8128 (an automated mixer that responds to MIDI program changes) and the Linemix™ 8, a standard, lower-cost, eight-input line mixer.
- Option 3 Stereo: Connect a stereo cord (i.e., with tip, ring, and sleeve connections) from the left Main output (the one labelled STEREO — important!) to a matching stereo connector in your amplifier or mixer.



MIDI: Run a MIDI cable from the master keyboard's MIDI out to the DPM V3's MIDI in. To drive additional tone modules from the same keyboard, patch the DPM V3 MIDI thru output to the next tone module's MIDI in. Patch the second module's thru into an additional module's MIDI in, and so on.

Caution: Do not attempt to connect more than three or four units together using thru connections, as this may affect the integrity of the MIDI data.



1.2d Studio Use with a Sequencer

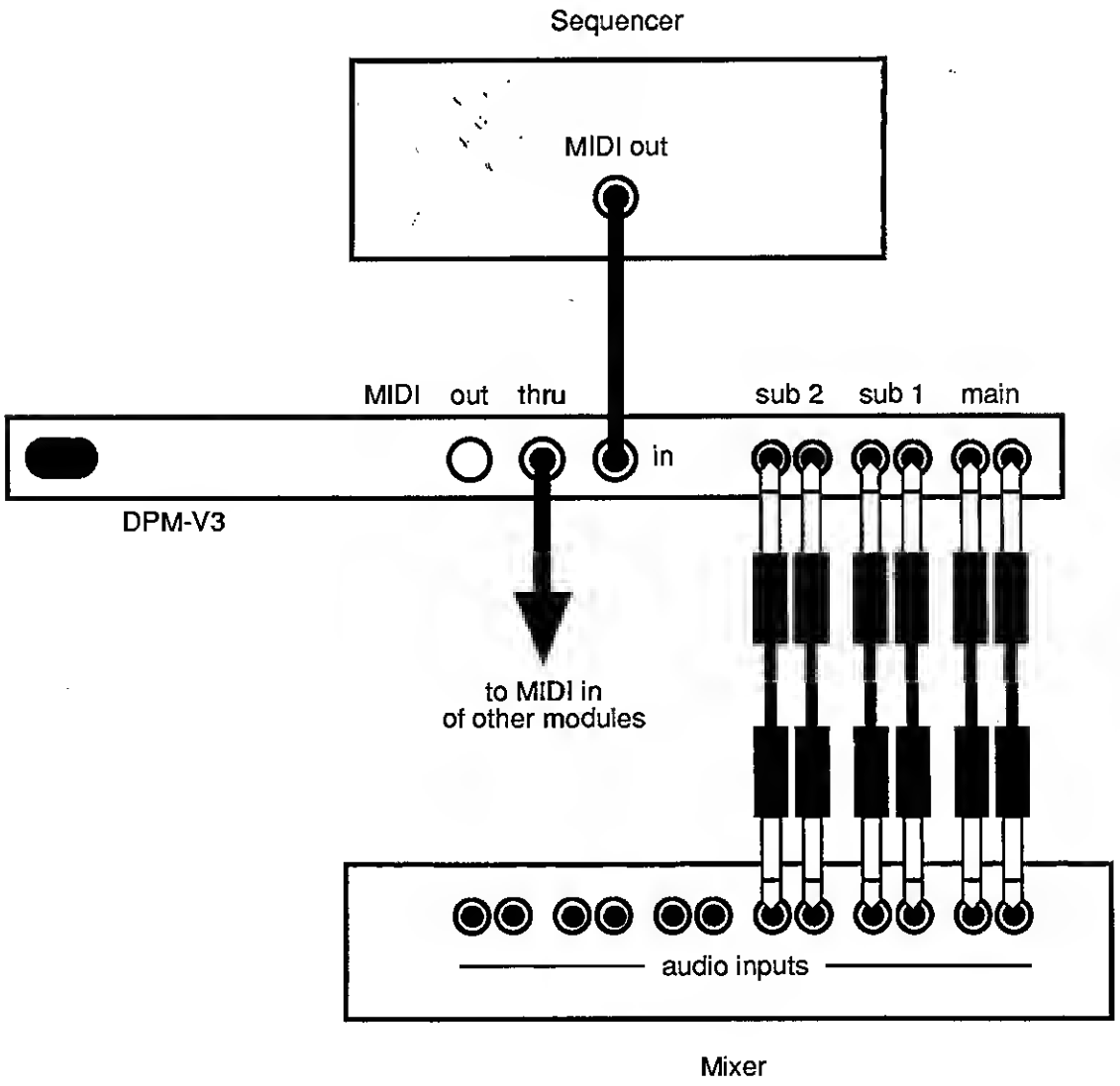
In many studio applications, the DPM V3 will serve as a multi-timbral sound expander module. The sequencer will probably generate data over several channels; the DPM V3 can be programmed so that individual programs play sequenced data from specific channels.

Example: If the sequencer is sending out a piano part over channel 1, a bass part over channel 12, and a string pad over channel 14, the DPM V3 could be programmed so that a piano sound plays only the MIDI data assigned to channel 1, a bass sound plays only the MIDI data assigned to channel 12, and a string pad plays only the MIDI data assigned to channel 14. This is called a *Multi* setup; the DPM V3 holds four such Multis, named Multi1-Multi4.

Audio: Multi-timbral operation is a bit more complicated because the six outputs (Main L & R, Sub 1 L & R, and Sub 2 L & R) allow for a variety of

output assignments. A program can be assigned to two outputs for stereo operation, but, also, more than one program can be assigned to the same output. This is useful if you have, for instance, two different bass sounds on two different channels where one plays in the chorus and another in the verse. Assigning both bass sounds to the same output frees up other outputs for other sounds.

The diagram below shows a typical sequencer-based setup that provides individual stereo outputs for three different sounds. Each of the sounds feeds its own pair of mixer input jacks. For more information on using the output structure, see the section on advanced applications.



MIDI: Run a MIDI cable from the sequencer's MIDI out to the DPM V3's MIDI in. To drive additional tone modules from the same sequencer, patch the DPM V3 MIDI thru output to the next tone module's MIDI in. Patch the second module's thru into an additional module's MIDI in, and so on. **Caution:** Do not attempt to connect more than three or four units together using thru connections, as this may

affect the integrity of the MIDI data.

1.2e Powering Up

Turn on your equipment in the following order (this is good practice for any MIDI/audio setup, not just the DPM V3):

- Computer or sequencer (if present)
- Synthesizers, sound generators, and signal processors
- Mixer (with master outputs turned all the way down!)
- Amplification system

Turn up the mixer master output controls to a low level as you test out the system. Turn up to normal volume once you're satisfied that the system is working properly.

1.3 GETTING AROUND THE DPM V3: THE FRONT PANEL

Now that the connections are made, it's time to match the DPM 3 to your particular setup. This involves a bit of programming, such as setting MIDI channels and the like. First, we'll explain basic DPM V3 programming protocols.

There are four main programming tools:

- 6 master buttons (Prog, Edit, Comp, Globl, MIDI, Exec). These select different programming *menus* except for Exec, which generally is like the "enter" or "return" button on a computer. In some cases, the DPM V3's display (see below) will ask you to press the Exec button after you've finished making your parameter selections.

When in the Edit or Prog menus, the Exec button provides a different function. Pressing Exec plays the note-on corresponding to middle C and releasing Exec produces a note-off for middle C. This allows you to trigger a note in the DPM V3 without having to reach over and play a keyboard or other controller.

- 4 parameter control buttons (Left, Right, Up, and Down Arrow buttons; the Up and Down Arrows are also called Inc/Dec buttons respectively). After selecting a menu, these let you navigate around the menus.

About Up/Down buttons. The Up/Down buttons serve two major functions. When no parameters are flashing, the Up/Down buttons select different pages within a menu (for example, the Global menu has eight separate pages, each of which affects a particular aspect of the DPM V3's overall operation). When a parameter is flashing on a given page, the Up/Down buttons set the parameter's value.

Holding down an Up/Down button will scroll through values or pages at a particular rate. To increase the rate, after pressing the button for the direction you

want to scroll (up or down), while holding down this button, press and hold the other button. This "fast scrolling" option is very handy when a parameter is set at, say, -99 and you want to move up to +99.

About Left/Right buttons. The Left/Right buttons select the parameter to be adjusted for a given page. Once you go past the left-most or right-most parameter, no parameters will flash (meaning you can select a different page). However, pressing the Right or Left button again will start going through the parameters again, from left to right or right to left, respectively.

Short cut. To instantly set a page to the non-flashing status so you can select another page, press the appropriate Master button (e.g., if you've modified a parameter in the Global menu and want to select another page, press the GLOBL button). The modified parameter will stop flashing and you can then select a different page.

Notes: Once you have selected a particular menu (Edit, Globl, MIDI) you can change pages within the menu without having to re-press the menu's master button.

To bail out of the programming process at any time, press the Right or Left Arrow until none of the parameters flash, then select a new page. Or, hit one of the six Master buttons at any time to choose a different menu.

- Two-line Liquid Crystal Display (LCD). This shows what's going on inside the DPM V3. When playing, the display shows the current program and the number of voices in use at any given moment.
- Continuously variable Data knob. This duplicates the function of the Up/Down buttons, but sometimes changing values is easier or faster to do by turning a knob. If you hold down a cursor button while turning the knob, the knob will control the cursor position.

Definition: When we talk about "selecting" a parameter during the editing process, it means that you can use either the Up/Down Arrow or Data knob to select a particular value.

Other front panel controls and features are:

- Volume control. This sets the master volume for the entire unit. Individual programs can also have their own individually programmed volumes, controlled proportionately by this master control.
- Memory cartridge slot. Peavey and other manufacturers offer alternate programs for the DPM V3 in cartridge form. Blank cartridges, such as the Peavey Cache Card™ (part #0071023), are available for saving your own programs to cartridge.

1.4 QUICK PARAMETER SETUP

Now that all the connections are made and you know how the front panel controls work, it's time to adjust the parameters necessary to match the DPM V3 to your particular setup.

1.4a Live Use with MIDI Keyboard

1. Determine the MIDI channel over which your keyboard is transmitting. If you do not know, assume it's channel 1.
2. Press the MIDI master button. The display should show the MIDI Channel and Mode. If not, press the Down Arrow button until the MIDI Channel and Mode page appears in the display.
3. Press the Right Arrow button. The parameter under MIDI Channel flashes. Select (remember, "selecting" a parameter during the editing process means you can use the Data knob or Up/Down Arrow buttons) the desired MIDI channel. If you don't know which MIDI channel to select, choose 01 for now and see the next step.
4. Press the Right Arrow button again. The parameter under Mode will flash. Select Poly mode if you have the keyboard and DPM V3 set to the same channel. If you are not sure how to set MIDI channels on your keyboard, set Mode to Omni so that the DPM V3 will respond to all MIDI data entering it, regardless of channel assignment.

1.4b Studio Use with a Sequencer

In this situation you will probably want to set up for multi-timbral operation. There are four independent multi-timbral setups, each called a Multi. Each "instrument" in a Multi must be set up individually.

1. Determine the MIDI channels to which you want to assign DPM V3 programs. The DPM V3 will play back up to sixteen channels simultaneously. If needed, the same program can be assigned to more than one channel. **Caution:** The DPM V3 cannot play more than 16 notes at a time. Therefore, assigning multiple programs to multiple channels increases the odds that newly-played notes will "steal" older notes that are still sounding. See section 1.5 for more information about how the DPM V3 reacts when asked to play more than 16 voices at a time.
2. Press the MIDI master button. The display shows the MIDI Channel and Mode.
3. Press the Right Arrow button. The parameter under MIDI Channel flashes. Select 01 for now.
4. Press the Right Arrow button again. The parameter under Mode will flash. Select Multi1 mode.
5. The Multi parameters are on a separate page. Press the Right or Left Arrow button until none of the parameters flashes, then press the Up Arrow button three times to select the Multi1 page (as confirmed in the display's

upper left corner).

6. Press the right Arrow until the C (channel) parameter flashes. Select the desired MIDI channel for the first program of the Multi.
7. To adjust the program volume, press the Right Arrow again so that the Vol parameter flashes. Higher values give higher volumes.
8. To assign the program output, press the Right Arrow again so that the P parameter flashes. Select the program's stereo output jack pair (1+2, 3+4, or 5+6).
9. To assign a particular program to Multi1, press the Right Arrow until the Prog parameter flashes. Select the desired program.
10. Press the Right or Left Arrow until the C (channel) parameter flashes. Select the desired MIDI channel for the second program of the Multi.
11. Assign the next program to the Multi in a manner similar to steps 7-9.
12. Select additional Multi programs in a manner similar to how the first and second programs were selected: select the channel, volume, output, and program. Limit yourself to four programs or so for now.

As you become more familiar with the DPM V3, you'll probably want to program setups for Multis 2-4 as well.

1.4c The Payoff!

1. You're almost ready to play either your keyboard or sequencer and hear the DPM V3 in action.

Press the Prog master button.

2. The display will show the last program selected (in a "virgin" DPM V3, program 000).
3. If you selected Omni or Poly mode (not Multi), check out the various programs by selecting them and playing your keyboard or sequencer. The display will show an eighth note for each voice in use as you play, thus confirming that the DPM V3 is receiving and understanding MIDI data. If no notes show up in the display:
   - Check your cabling.
   - Check the MIDI channel assignments on your sequencer/master controller and the DPM V3.

   If you don't hear any audio:
   - Make sure you're using the right output connections. Try different outputs if the problem persists.
   - Check that the amplifier is on and the mixer volume turned up.
   - Make sure the DPM V3's front panel volume control is turned up.

4. If you selected Multi mode, audition various programs by selecting the desired Multi and changing programs (see step 9 in section 1.4b).

Now that things are up and running, check out the programs that come with the DPM V3. They've been developed by musicians specifically for the DPM V3 and they make some pretty nice noises.

1.5 ABOUT DYNAMIC ALLOCATION

The DPM V3 can play up to 16 voices at a time. However, each voice can consist of two oscillators making different sounds or tuned to different pitches, allowing 16 keys to play up to 32 notes simultaneously.

If 16 voices are playing (or sustaining) and you play a new key, this will "steal" a voice from one of the 16 that was played. The next new voice will "steal" a second voice, and so on.

Combi programs (see section 3.14 for more information), which can layer two or more programs, use up more voices since layering two programs halves the number of available voices. A Combi with two layered programs allows up to eight voices, and a Combi with four layered programs, up to four voices. A Combi with three layered programs will play five voices, but if you play a sixth note while the five are sustaining, one of the Combi programs will play the one remaining voice.

Each voice in use is shown on the display as an eighth-note. This makes it easy to see how many voices are available, which is particularly useful with sequencer-driven multi-timbral setups since they tend to use up lots of voices.

Chapter 2 — Modifying Existing Sounds

Here are some of the most common "tweaks" for customizing the DPM V3. This does not cover all the DPM V3 has to offer; see Chapter 3 for detailed programming information.

Important: Any changes made to the factory patches shipped with the unit will, if you saved those changes, be remembered by the DPM V3. You will not be able to recall the factory patches unless you have saved them first, either to a cartridge (section 2.1e) or via MIDI (section 2.2f). If for some reason you cannot restore the factory patches, consult your Peavey dealer.

2.1 GLOBAL MENU TWEAKS

The following options are accessible under the Global menu. Any edits made in the Global or MIDI menu are remembered; the next time you turn on the DPM V3, any changes made to these menus will be retained, even if memory protect (described later) is on.

The general protocol for tweaking is:

1. Press the GLOBL master button. This is not necessary if you are already in the Global menu.
2. Select the desired page.
3. Use the Right/Left buttons to choose the parameter to be modified.
4. Select the parameter value.

2.1a Master Tuning (-99 to +99)

This tunes the DPM V3 to other instruments or concert pitches other than A=440.

1. Select the GLOBAL Tune/VelCurve page.
2. Press the Right or Left Arrow until the Tune parameter flashes.
3. Select the desired tuning offset.

2.1b Velocity Curve (1, 2, or 3)

Different players play their keyboards with different degrees of force. This matches the DPM V3 to your playing style.

1. Select the GLOBAL Tune/VelCurve page.
2. Press the Right or Left Arrow until the VelCurve parameter flashes.
3. Select the desired "feel": 1 (matches the DPM 3 keyboard exactly), 2 (exponential wide range velocity response), and 3 (linear, somewhat more "compressed" velocity response).

2.1c Display Viewing Angle (-03 to +04)

The display is easier to read at some angles than at others. This adjusts the display

for the best contrast for your particular viewing angle.

1. Select the GLOBAL View/Protect page.
2. Press the Right or Left Arrow until the View parameter flashes.
3. Select the desired viewing angle. 0 works best for straight-on viewing. More negative numbers optimize the viewing angle if you're looking at the DPM V3 from below; more positive numbers optimize the viewing angle if you're looking at the DPM V3 from above.

2.1d Memory Protect (Off or On)

With memory protect on, program parameters may be edited, but you cannot store the results of these edits. When off, you can edit and then save a program to retain the results of your edits.

1. Select the GLOBAL View/Protect page.
2. Press the Right or Left Arrow until the Protect parameter flashes.
3. Select OFF or ON.

It's worth mentioning again that MIDI and Global parameters are always remembered and are not affected by the Memory Protect status. Memory protect affects the programs (internal and cartridge) only.

2.1e Cartridge Memory Management

The DPM V3's internal memory is divided into two banks of 100 programs. Bank data can be saved to the cartridge, or cartridge data may be loaded into the banks.

This menu also lets you initialize a cartridge. Initializing is required because Peavey anticipates that in the future, lower memory prices will allow for cartridges that can hold a greater number of programs (the DPM V3 is designed to handle 800-program cartridges should the technology become affordable). Therefore, different cartridges will require different initialization routines. The current routine initializes the Peavey 32K Cache Card; think of initializing as drawing the "parking lot lines" into which you "park" your programs.

1. Select the CART Task page.
2. Press the Right or Left Arrow until the lower line flashes.
3. Use the Up/Down buttons to select from the following choices:

   LOAD>BANK 1 Loads the cartridge data into the first 100 programs (000-099).
   LOAD>BANK 2 Loads the cartridge data into the second 100 programs (100-199).
   SAVE BANK 1 Saves programs 000-099 to a RAM cartridge. Data cannot be saved to a ROM cartridge, or to a RAM cartridge if Memory Protect is on.

SAVE BANK 2 Saves programs 100-199 to a RAM cartridge. Data cannot be saved to a ROM cartridge, or to a RAM cartridge if Memory Protect is on.

INIT CART Initializes a cartridge to accept program data. ROM cartridges cannot be formatted.

4. After selecting the desired option, press the Exec master button. The [EXEC] in the display's upper right corner is there to remind you that you must press Exec to finalize the selection process.

Note: Cartridges for the DPM 3 are compatible with the DPM V3, and DPM 3 programs can be loaded into the DPM V3.

The other Global options involve microtunings and drum kit setup and selection. These are described in detail in section 6.4 and Chapter 5, respectively.

2.2 MIDI MENU TWEAKS

All of the following are accessible under the MIDI menu. Any edits made in the Global or MIDI menu are remembered; the next time you turn on the DPM V3, any changes made to these menus will be retained, even if Memory Protect (described earlier) is on. The general protocol is:

1. Press the MIDI master button. This is not necessary if you are already in the MIDI menu.
2. Select the desired page.
3. Use the Right/Left buttons to choose the parameter to be modified.
4. Select the parameter value.

2.2a Set Middle C (36 to 84)

You can offset Middle C to any note within the MIDI note range of 36 to 84 (60 is the default for middle C). Think of this as a "global transposition" option.

1. Select the MIDI Ovf/MidC/Xctrl page.
2. Press the Right or Left Arrow until the MidC parameter flashes.
3. Select the desired amount of transposition.

2.2b Choose External MIDI Controller (02-31)

Many program parameters can be controlled by external MIDI Continuous Controller messages. If you are not familiar with these, read the MIDI supplement (Chapter 7). This option lets you choose a specific number for the external MIDI controller.

1. Select the MIDI Ovf/MidC/Xctrl page.

2. Press the Right or Left Arrow until the Xctrl parameter flashes.
3. Select the desired controller number.

2.2c Filter Out MIDI Data

In some cases, the MIDI device driving the DPM V3 may generate data that you don't want the DPM V3 to receive. Example: You might want to ignore program changes if you're tweaking a particular patch; a program change would force the DPM V3 to a different patch, and you would lose the results of your edits. This option lets you filter out a variety of MIDI commands.

1. Select the MIDI Filter/Stat page.
2. Press the Right or Left Arrow until the Filter parameter flashes.
3. Select the MIDI data to be either ignored or received:

   SYSTEMX System Exclusive data
   PEDAL Footpedal data (Controller 4)
   VOLUME Volume data (Controller 7)
   PROGRAMS Program changes
   SUSTAIN Sustain pedal (Controller 64) and Hold 2 (Controller 69)
   PRESSURE Pressure (also called aftertouch)
   PWHEEL Pitch wheel (pitch bend)
   MODWHEEL Modulation wheel (Controller 1)

4. After selecting the desired parameter, press the Right Arrow button until the Stat (Status) parameter flashes.
5. Select IGNOR (corresponding data will be ignored) or RECEV (corresponding data will be received).

Note: Each parameter must be individually set to IGNOR or RECEV. Also, some master keyboards assign the footpedal to controller 7, reasoning that it will be used as a volume pedal. If you have problems ignoring pedal information, this might be the cause.

2.2d MIDI Program Change Map

You may not want a one-to-one correspondance between program changes generated by your master keyboard (or sequencer) and the DPM V3. Example: You might want program change 1 on your keyboard to select program 37 on the DPM V3.

Furthermore, the MIDI specification provides for 127 programs; yet, the DPM V3 contains 200 programs. The program change map lets you map incoming MIDI program changes to any of DPM V3 programs 000-199 (but not cartridge programs). To create a MIDI program change map:

1. Select the MIDI Prog Change Map page.

2. When OFF, there is a one-to-one correspondance between program changes and the DPM V3 programs. To create a program change map, press the Right or Left Arrow until the OFF parameter flashes.
3. Select the incoming MIDI program number with the Data knob or Up Arrow button. The left-most program number parameter will flash; this is the incoming MIDI program number.
4. Press the Right Arrow again until the right-most program number parameter flashes. This is the DPM V3's target program to which the incoming program change will be assigned.
5. Select the target program to which the incoming program number will be mapped.
6. Repeat steps 2-5 until the program change map is complete.

2.2e Initialize Program Change Map

To cancel all Program Change Map assignments and start over from scratch (i.e., the Program Change Map will show a one-to-one correspondance between program changes generated by your master keyboard and the DPM V3), follow steps 1-3 in the previous section but scroll all the way past incoming program 127. The display says MIDI Prog Change Map [EXEC] to Init. Press Exec, and the Map will be initialized, as confirmed by the display saying Function Complete.

2.2f MIDI Bulk Dump

Although the DPM V3's memory is non-volatile (i.e., it is battery-backed up to prevent loss of data while the unit is turned off), accidents can happen, from a battery going bad to operator error (Ooops! Didn't mean to load the cartridge data into Bank 1 after all.). As a result, it's a good idea to save your data periodically.

You may also become sufficiently seduced by the DPM V3's programming options to make up sets of your own sounds. These should also be saved.

Although cartridges are a convenient storage medium, they are not cheap. Many MIDI sequencers and keyboards can record System Exclusive data for storage; playing this data back into the DPM V3 will restore the programs you saved.

To save data via MIDI:

1. Connect a MIDI cable from the DPM V3's MIDI out to the MIDI system exclusive storage device's MIDI in.
2. Set up your MIDI system exclusive storage device to record system exclusive data. Refer to the product's manual for how to do this.
3. Select the DPM V3's MIDI Bulk Dump page.
4. Press the Right or Left Arrow button until the bottom line flashes.
5. Select the type of data to be saved:

PGM 0 ➡99 Saves the first 100 programs. File size 47.6K.
PGM 100 ➡199 Saves the second 100 programs. File size 47.6K.
ALL PROGS Saves all 200 programs. File size 95.3K.
DRUM KITS Saves all drum kit data. File size 5.1K.
GLOBAL DATA Saves all global and MIDI parameters. File size 0.8K.
ALL DATA Saves everything — programs, drum kits, and global/MIDI parameters. File size 101.2K.

6. After selecting the data type to be saved, press Exec. Note the [EXEC] in the display's upper right corner, indicating that you must press Exec to finalize the selection process.
7. The receiving unit should somehow show that it is receiving MIDI data. Dumping all data takes a little over 30 seconds, so don't get impatient.

If you cannot save All Data via MIDI, it's possible that the system exclusive receiver doesn't have sufficient memory to save a 101.2K file. Check the receiving unit's manual for further information on maximum file size, and try saving each bank of 100 programs individually (most units should be able to cope with a dump of 47.6K).

To receive data via MIDI:

1. Connect a MIDI cable from the MIDI system exclusive storage device's MIDI out to the DPM V3's MIDI in.
2. Set up your MIDI system exclusive storage device to transmit system exclusive data. Refer to the product's manual for how to do this. Make sure that the DPM V3 data you previously saved is loaded into the system exclusive storage device so it can be sent to the DPM V3.
3. Initiate transmission at the system exclusive storage device. You need not set anything at the DPM V3; it will automatically load the data being sent to it.

Note: Because many sequencers can now record system exclusive information as part of a sequence, you may want to record the data used for a particular song at the head of a sequence.

2.3 EDIT MENU TWEAKS

The edit menu contains a wealth of commands for modifying the DPM V3's sounds or creating your own from scratch. The next Chapter describes all the options and provides a tutorial on basic synthesis techniques, but here are some of the most common tweaks. The general protocol is:

1. Press the Edit master button. This is not necessary if you are already in the Edit menu.
2. Select the desired page.
3. Use the Right/Left buttons to choose the parameter to be modified.

4. Select the parameter value.

Important: Any changes you make must be saved to the current program or a different one. Selecting a different program without saving the program you modified will cancel any edits you made.

2.3a Save a Modified Program

1. After modifying the program, make sure that no parameters are flashing.
2. Press the Up Arrow key (or do a couple turns of the data knob) until you reach the very last (Save to) page of the Edit menu.
3. If you want to save to the program you just modified, press the Exec button. Note the [EXEC] in the display's upper right corner, indicating that you must press Exec to finalize the saving process.
4. To save to a different program number, press the Right Arrow key. The program number will flash.
5. Select the program number where you want to store the modified sound.
6. Press the Exec button.

   Note: If the display says MEMORY Protected, memory protection must be turned off before you can save. Refer to section 2.1d for more information on the memory protect function.

2.3b Change Program Name

Renaming is handy to identify modified programs or ones you've created from scratch.

1. Press the Prog master button and select the desired program.
2. Press the Edit master button.
3. Press the Right Arrow button. The first character will flash.
4. Select the new character.
5. Press the Right Arrow button to select the next character to be changed.
6. Select the new character.
7. Repeat steps 5 and 6 until the name is complete.
8. Save the program if your other program edits are done.

Note: Characters available for naming are (in order of appearance as you turn the Data knob clockwise):

Upper & lower case alphabet
Space (blank)
0-9
+
-
=
(
)
*
&
△
%
$
#
@
!
➡ (right arrow)
{
}
[
]
| (vertical line)
' (single quote symbol)
:
;
?
/
, (comma)
. (period)

2.3c Change Overall Timbre ("Brighter/Duller")

Although there are many ways to change timbre in the DPM V3, the following method is fast and takes care of many situations where you want to modify timbre.

1. Assuming you're in the Edit menu, select the FILTER Cutoff/Res page.
2. Press the Right Arrow button. The Cutoff parameter will flash.
3. Increase the value for a brighter sound; decrease for a duller sound.

2.3d Increase/Decrease Timbre "Dynamics"

Sometimes the timbre responds dynamically over time, perhaps according to keyboard velocity or to the DPM V3's internal envelope generators. The DPM V3 offers two different modulators (options that change dynamics over time) for the filter; this process involves editing one, the other, or both to create the desired effect.

1. Assuming you're in the Edit menu, select the FILTER FMod1/Amount page.
2. If the FMod1 parameter is set to anything other than OFF, then it is being modulated by some option. If the FMod1 parameter is off, proceed to step 6.
3. Press the Left Arrow button to select the modulation amount.
4. Increase the value for a wider range of timbre variations, and decrease the value for a narrower range of timbre variations.
5. Press the Right Arrow so that the parameter stops flashing (or press the master Edit button to accomplish the same result).
6. Select the FILTER FMod2/Amount page.
7. If the FMod2 parameter is set to anything other than OFF, then it is being modulated by some option. If it is OFF, then you'll need to get into some more advanced programming techniques to modify the timbre "dynamics."
8. Press the Left Arrow button to select the modulation amount.
9. Increase the value for a wider range of timbre variations, and decrease the value for a narrower range of timbre variations.

Note: If only one of the FMod parameters is being modulated, this is a fairly simple edit. If both FMod1 and FMod2 are being modulated, the edit becomes more complex since these two settings may interact to some extent. Experimentation will help you find the best results.

2.3e Change Program Volume Level

This changes a program's level relative to the other programs.

1. Assuming you're in the Edit menu, select the OUT Vol/Pan/Bend page.
2. Press the Right Arrow button until the volume parameter flashes.
3. Select the desired volume.

2.3f Change Stereo Pan

Since there are three individual stereo outputs, it's often helpful to be able to pan different sounds to different parts of the stereo field so you don't have to constantly re-adjust mixer panpot settings.

Note: The pan position can also be modulated by two different modulation sources. If the pan position is being modulated, then that will also affect the stereo position as well as any changes you make in the Pan page.

1. Assuming you're in the Edit menu, select the OUT Vol/Pan/Bend page.
2. Press the Right Arrow button until the Pan parameter flashes.
3. Select the desired pan position (more positive values pan more to the right, more negative values pan more to the left).

2.3g Set Pitch Bend Range

This determines how much the pitch of a program will vary in response to either upward or downward travel of a pitch bend wheel. **Example:** If set to a whole tone, rotating the pitch bend wheel all the way away from you will increase the pitch by a whole tone, and rotating the pitch bend wheel all the way toward you will decrease the pitch by a whole tone.

1. Assuming you're in the Edit menu, select the OUT Vol/Pan/Bend page.
2. Press the Right Arrow button until the Bend parameter flashes.
3. Select the desired bend amount: (OFF, HALF, WHOLE, M3RD (minor third), THIRD (major third), 4TH, DM5TH (diminished or flatted fifth), and FIFTH.

2.4 INITIALIZE ENTIRE UNIT

This operation will restore the original factory global and MIDI settings, reset the MIDI program change map, erase any samples stored in user RAM (if present), restore *all* programs to a default patch (not the factory patches shipped with the unit), and *erase any edits you have made.* Initialization is useful if, for example, you want to create a set of sounds from scratch.

Initialization is also a service procedure. Sometimes microprocessor-controlled devices will "lock up" due to spikes or surges on the AC line, a static electricity jolt, or other gremlins. Initialization will reset the unit and, in many cases, prevent a trip to the repair shop.

Remember — any patches will be lost during initialization! Back up the factory patches when you first receive your DPM V3 and save your work often so that if you ever do need to initialize, your edits will not be lost.

To initialize:

1. Turn the power off (if it's on) and wait 15 seconds or more.
2. Hold both the PROG and Right Arrow buttons down while turning on power.
3. Continue holding down the buttons until the display shows P000 *Initialized*.

Chapter 3 — DPM V3 Programming

3.1 HISTORY AND BACKGROUND

Synthesizers used to consist of various hardware modules, some of which generated signals, and some of which modified those signals. Much of audio involves elements that make sounds and elements that modify sounds (such as a guitar and amplifier).

Early synthesizers were highly experimental devices. To be as general-purpose as possible, patch cords connected the inputs and outputs of the various signal generating and processing modules (which is why particular synth sounds were called patches). Changing a patch involved manually repositioning patch cords and adjusting knobs and switches; if you wanted to recreate a patch at some later time, it was necessary to write down all the patch settings on paper. Even then, due to the vagaries of analog electronics, trying to recreate a patch often didn't produce the same results.

Over the years, certain combinations of modules seemed to work better than others, and since patch cords were troublesome to deal with, eventually these modules were wired together in a "normalized" configuration. Synthesizers such as the Minimoog, Prophet-5, and others eliminated the need for patch cords by containing a normalized collection of sound modules.

3.1a How the DPM V3 Generates Sound

The DPM V3 uses the same approach to sound generation as Peavey's DPM 3, the first popularly-priced keyboard synthesizer to use general-purpose Digital Signal Processing (DSP) chips for sound generation. These chips are essentially computers designed to generate and/or process digital audio signals, and can even do special effects like chorusing and reverb. The DPM V3's three DSP chips are in turn controlled by a central computer. Because the function of these chips depends on the software controlling them, it is possible to upgrade the DPM V3 with entirely new methods of sound generation by writing new software.

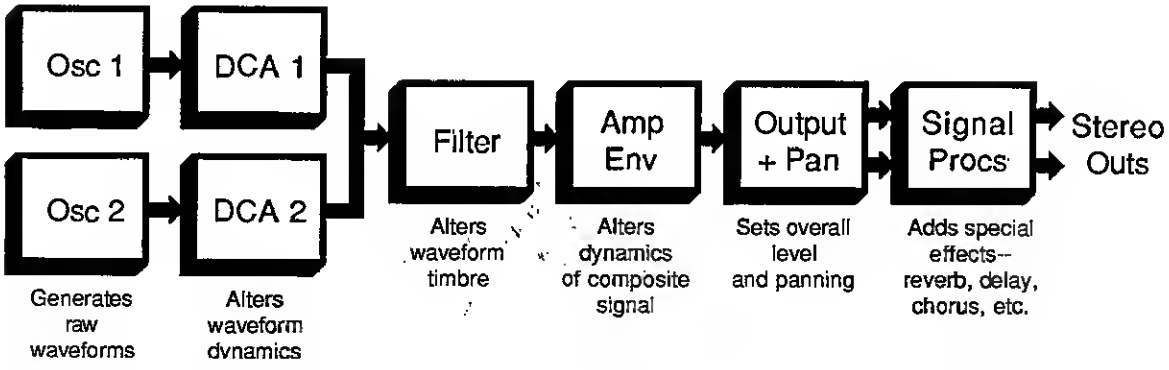
3.1b Software Emulation of an Analog Synthesizer

In the current generation of DPM V3 software, the DSP chips have been programmed to emulate a traditional analog synthesizer, but with digital sound-generating capabilities. Each synthesizer "module" is a page on the display, and each "knob" or "switch" is a parameter on the page. You can step through different parameters using a combination of buttons and a data entry knob. All "patching" is done via software, eliminating the need for patch cords; you simply specify which inputs should receive which outputs in those cases where connections are not normalized.

You can take a "snapshot" of all the DPM V3's parameters and save this in memory as a program. The DPM V3 stores 200 programs on-board and another 100 (300 total accessible) on a RAM or ROM cartridge card that plugs into the front panel card slot.

3.1c The DPM V3 Sound Generating Architecture

The following figure shows the signal flow within the DPM V3. We'll give an overview of each module, then describe how these modules work in more detail.



The digital oscillators (OSC1 and OSC2) provide the actual raw sounds; these can come from the internal wavesamples or from samples loaded into memory by the user. Two different wavesamples can be played by each key. Each wavesample has its own digitally-controlled amplifiers, DCA1 and DCA2, that can change the level of the sounds either statically (you set a particular volume level), dynamically (the level changes over time in a specific way), or a combination of the two. The process of varying a parameter dynamically is called modulation; the DPM 3 offers a variety of modulation sources, described later.

Next in line is a low pass filter, which allows for static or dynamic timbre variations. This is followed by another digital amplifier that determines the dynamics of the overall sound. Finally, an output stage provides panning options and interfaces with the on-board signal processors.

Synthesizer programming is the art and science of altering the parameters of various modules to shape sounds in a particular way. Please understand that this can be a complex process and is not mastered in a day, a week, or even a year. Although this manual presents much information about synthesizer programming, it is beyond the scope of any manual to offer a complete course in programming. The best way to learn is to adjust different parameters as you play to discover how different parameter values affect the sound. Also, become familiar with the signal and modulation flow within the DPM V3 (as shown in the various block diagrams) so that you can understand what happens to a signal as it works its way from oscillator to output.

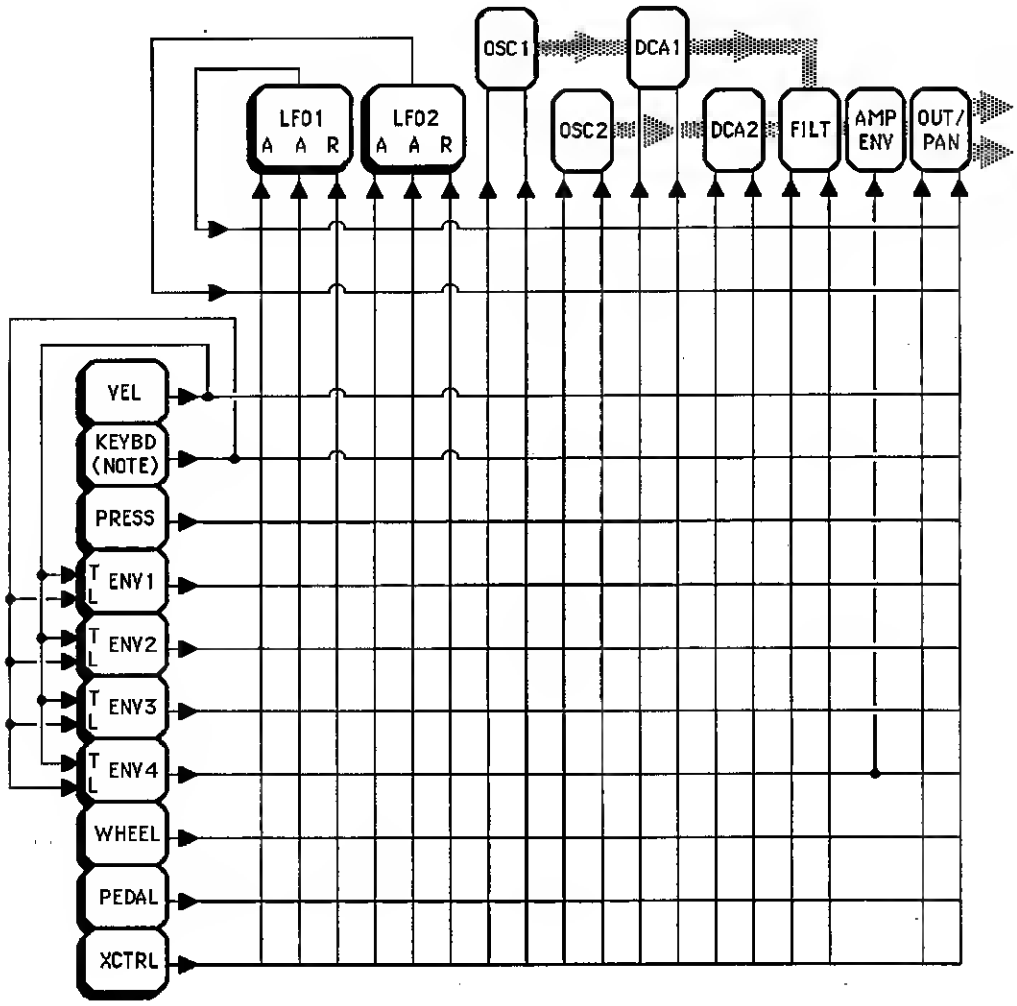
Now let's look at modulation, and the various modules, in more detail.

3.1d About the DPM V3 Modulation Matrix

Modulation modifies some aspect of a sound over a period of time. Since synthesizers inherently make static sounds (unlike acoustic instruments, whose timbre and dynamics change often radically over the duration of a note), proper use of modulation is the key to making more expressive sounds.

The DPM V3 has a variety of modulation sources, depicted by blocks with heavy lines, as shown in the figure below. These are described in detail in the reference section. The main categories are:

- Modulation signals generated by the way you play the keyboard or other controller driving the DPM V3 (Velocity, Note Position, and Pressure)
- Envelope generators (these produce a programmable modulation change over time)
- LFOs (these produce periodic, cyclic modulation changes over time, such as vibrato or tremolo)
- Performance controls (modulation wheel and foot pedal, which are designed to be manipulated in real time, as you play)
- External MIDI control; this allows external MIDI control signals (e.g., from a sequencer) to control some aspect of the DPM V3's sound



The DPM V3 arranges its modulation source outputs and modulation destination inputs into a "matrix" so that virtually any output can feed virtually any input. The OSC, DCA, FILTER, and PAN modules have two independent inputs that can be assigned to any modulation source. The LFO has two independent inputs that control modulation Amplitude (depth), but also has a third input that controls modulation Rate.

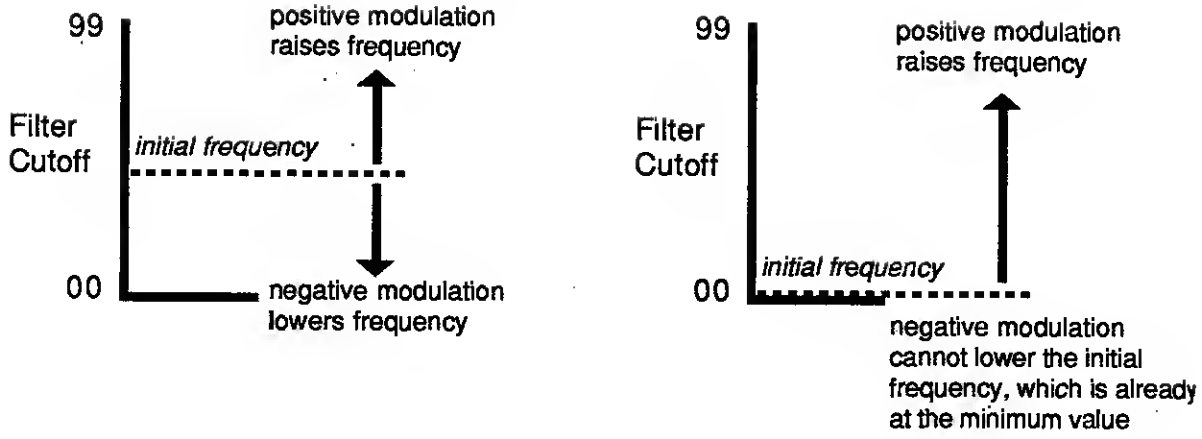
There are also some normalled connections where a particular modulation input permanently connects to a particular modulation source. The AMPENV module is normalled to Envelope 4 only; the Envelope Generator Time and Level parameters are normalled to the Velocity and Note Position modulation sources.

Each non-normalled modulation input includes two parameters: *modulation source* (including off if no modulation is desired), which lets you choose from the various modulation sources mentioned above, and *modulation amount*.

The modulation amount can be positive or negative. With positive amounts, an increasing control signal increases the value of the parameter being controlled. With negative amounts, an increasing control signal decreases the value of the parameter being controlled. A setting of 00 is equivalent to turning off the modulation source; conversely, turning off a modulation source is equivalent to setting the amount to 00.

Note that having two modulation inputs available allows for interaction between two modulation signals. **Example:** If a parameter responds to keyboard velocity and an envelope generator, the parameter will follow the general envelope shape, but be influenced by the velocity as well.

If a "baseline" setting exists, modulation amounts add or subtract values from that setting. **Example:** If a filter cutoff is set to a certain frequency, positive modulation amounts will increase that frequency, and negative modulation amounts will decrease that frequency. Note that modulation cannot force a value beyond its maximum range. In other words, if the filter cutoff is at the lowest possible frequency, then maximum positive modulation will vary the filter cutoff from the lowest to the highest frequency. Applying negative modulation will not affect the filter frequency, because if it's at its lowest value, it cannot go any more negative.



3.1e Oscillators

The DPM V3 has two oscillators which can draw from any of the 105 on-board wavesamples (or 10 drum kits). Both oscillators allow for adjustable pitch, level, and two modulation sources.

Choosing the same wavesample for both oscillators, and slightly detuning them, creates a thicker sound. However, combining different wavesamples can produce novel effects. **Example**: Suppose you're looking for a really deep piano sound; try adding a bass sample, tuned up an octave and at a much lower volume, behind the piano sound.

3.1f DCAs

Each oscillator has a DCA, because this allows for, among other effects, crossfades between the two oscillators. **Example:** One DCA could fade out a flute sound while the other DCA fades in a synth waveform for a synth flute sound.

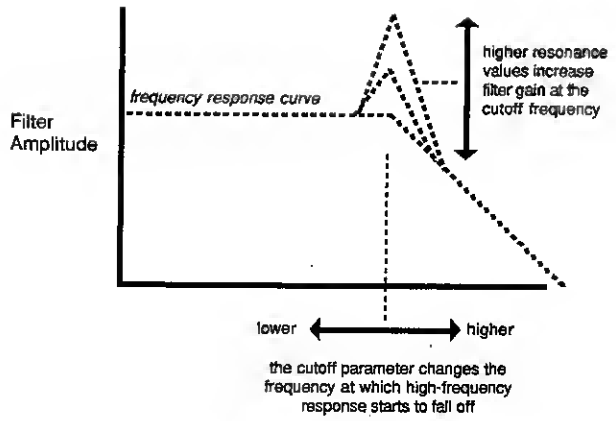
Since each wavesample has a level control, you'll more likely use the DCAs for dynamic effects than simply setting them to a static volume level. One common modulation option is to increase the level via keyboard pressure. Modulating with an LFO varies the amplitude cyclically, creating tremolo effects. Modulating with an envelope can produce attack and decay effects.

The "Amp Env" DCA that follows the filter has no controls other than those for Envelope 4. It is always controlled by this envelope.

3.1g The Filter

A lowpass filter varies a signal's harmonic content by providing progressively greater degrees of attenuation above a specified cutoff frequency. Higher cutoff frequencies give a brighter sound; lower cutoff frequencies give a bassier sound since fewer harmonics are present.

Another filter parameter is resonance. This increases the amount of gain at the cutoff frequency, which produces a sharper, more resonant sound at high resonance settings. The following figure correlates the cutoff frequency and resonance parameters.



The difference between filter resonance and cutoff

Although static filter settings are useful, varying the filter setting dynamically over time often produces more interesting effects. Modulating with velocity will produce brighter sounds with louder dynamics, thus giving a sound more like an acoustic instrument. Modulating with an envelope can create a particular change in harmonic structure, such as the increase in harmonics that happens when blowing more wind into a wind or brass instrument.

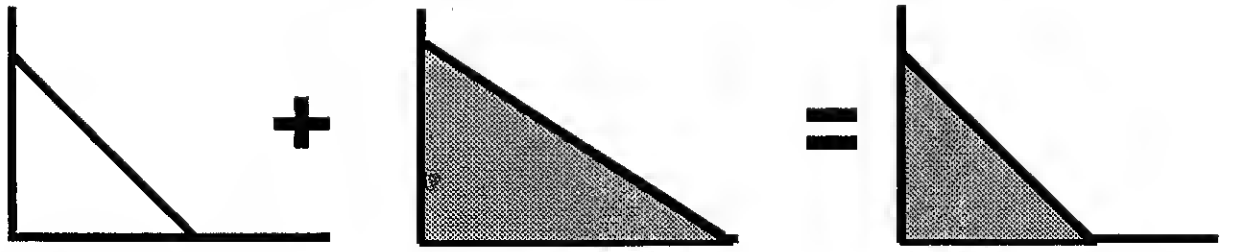
Also, remember that when using negative modulation, the filter cutoff should be set to the upper limit of the intended range, since increased modulation will drive the filter to a lower cutoff frequency.

Modulating the filter with the keyboard is also useful since it correlates the cutoff frequency to the note being played on the keyboard. With 0 modulation amount, the filter cutoff tracks the keyboard pitch. Thus, if you have a certain harmonic structure when you play one key, playing a different key will shift the filter frequency to maintain the same harmonic structure.

With negative tracking, the cutoff will change at a less than normal rate as you play higher on the keyboard. This is ideal for bass patches since the lower notes should have more highs, and the high notes should be more muted.

With positive tracking, the filter cutoff will increase at a faster rate than pitch as you play higher up on the keyboard. This works well when you want the lower notes to be muted and the higher notes to really "cut."

Note: Filter and DCA settings can interact. For example, the filter cutoff can be so low that no signal can get through. Also, if the DCA is set for a short decay, then you won't hear a long filter decay because the volume will reach zero before the filter decay finishes (see the following figure).



If the DCA is set for a short decay...

...and the filter is set for a long decay...

...you won't hear the effect of the long filter decay because the signal level will have decayed to zero before the filter decay is complete.

How DCA and filter envelopes interact

The combination of two oscillators, two DCAs, one filter, a final DCA, and various modulation sources is called a voice.

3.1h About Levels and Distortion

Level can be altered at numerous points within the DPM V3. Each oscillator has a level parameter; the envelopes driving the DCA and final amp have variable levels (which also influences the overall volume); and the signal processing section offers several level-setting options to choose the right blend between processed and straight signals.

As with any audio system, carelessly turning up levels may produce overload conditions that result in distortion. If you encounter distortion, try the following:

- Lower the overall level of the DPM V3 or of individual programs. Also, make sure you're not overloading your mixer or amp; the DPM V3 puts out a pretty hefty signal.
- Lower the signal processing output level parameters (the L parameter, discussed in Chapter 4 on signal processing).
- If distortion still occurs, the final amp may be overloaded. Try lowering the ENV 4 level parameters as these affect the final amp levels.
- High filter resonance settings can cause distortion. To solve this, reduce the levels of the two oscillators to feed a weaker signal into the filter, or reduce the amount of resonance.

Unintentional distortion will probably not occur often, but when it does, try some combination of the above remedies. As you become more familiar with the programming process, you will learn how to balance levels to minimize distortion. Generally, step 1 above is all you need to do; step 3 will solve virtually any remaining distortion problems.

3.2 DPM V3 PROGRAMMING TECHNIQUES

Now that we've covered the basics, let's look at the available synth parameters.

Important: In order to save space (there's a lot to discuss here!), we'll assume that you've pressed the Edit master button and know how to select pages and parameters, as described earlier in the manual.

Each heading (typed in UPPER CASE) will be for a particular module (oscillator, filter, etc). Several modules contain multiple "pages" of parameters, with a page consisting of the parameters shown on a single display screen. Pages are presented in ascending order (i.e., each page is followed by the page that occurs if you press the Up Arrow button). In addition to describing parameters, any necessary background information on a function will also be presented.

3.2a About the Compare Function

When you edit a DPM V3 program, you are actually editing a copy of the program. This has two important ramifications:

- To retain the results of your edit, you must save it to a particular program location. If you switch program locations before saving, your edits will be lost.

- Because the original program remains undisturbed, you can compare the edited version to the original program by pressing the COMP (compare) master switch.

The display will indicate an edited program by showing *E* in the lower left-hand corner. If you select the original program via the compare function, you'll see *C* (for compared version) in the lower left-hand corner.

3.3 PROGRAM NAME

This is the first page of the Edit menu. To change the name, use the Left/Right Arrow buttons to choose the character to be changed, then select the desired character. For more information, see section 2.3b.

3.4 OSC 1

Oscillator 1 has four pages of parameters.

Page 1 Parameters

Wave
Selects one of the available waveforms listed below.

Traditional analog synthesizer waveforms

Sine (no harmonics; very pure tone)
Triangle (weak even harmonics; clarinet-like)
Sawtooth (odd and even harmonics; brass-like)
Square (strong odd harmonics; hollow-sounding)
25% Pulse (various harmonics missing; reedy)
20% Pulse (various harmonics missing; reedy)
15% Pulse (various harmonics missing; reedy)
10% Pulse (various harmonics missing; reedy)
5% Pulse (various harmonics missing; buzzy)

Digitally generated waveforms

DGW1-5

Non-harmonic waveforms

Spec1-5

Combination loops

B Loop
C Loop
ABCHR
Koto

Organs

Pipes
Full B3
Jazz B3
Organ 1
Organ 2
Percussive Organ

Bells

Bell 1
Bell 2

Bass

Fingerbass
Pick Bass
Fretless
Slap Bass
Acoustic Bass
Syn Bass
Synth Bass 2-4

Pianos

Piano
Electric Piano Loop
Electric Piano 1-4
Harpsichord

Guitars

Acoustic Guitar
Electric Guitar 1-3
Guitar Loop 3

Orchestral

String
Orkhit

Voices

Abbey
Male

Accordians

Squeezebox

Noise

Lightning
Breath
Steam
Bottle

Wind Instruments

Flute
Flute 2
Clarinet
Oboe
Sax
Trumpet
Trombone
Synth Brass

Tuned Percussion

Woody (marimba)
Metal (struck)
Vibes

Drum Sounds

Tom 1
Tom 2
Conga
Timbale
Taiko
Gambng
(Gamelan variation)
Gamelan
Kalimba
Agogo
Cowbell
Clave
Tambourine
Cabasa
Claps
Triangle
Pole
Scratch (turntable)
High hat closed
High hat open
Ride
Crash
Reverse Cymbal
Electric Tom
Kick 1-5
Snare 1-4
Sidestick
Kit 0-9

Level (00-99)
Selects the waveform level. Lower values are softer, higher values are louder.

Page 2 Parameters

Coarse (-24 to +24 semitones)
Adjusts oscillator 1's frequency in semitone steps, from -24 (transposed down two octaves) to +24 (transposed up two octaves).

Fine (-99 to +99 cents)
Adjusts oscillator 1's frequency in cents, from -99 (transposed down 99/100 of a semitone) to +99 (transposed up 99/100 of a semitone).

Page 3 Parameters

PMod1 (Off, Velocity, Keyboard, Pressure, Envelopes 1-4, LFO 1, LFO 2, Mod Wheel, Foot Pedal, External MIDI Control)

Chooses the pitch modulation source. For details on modulation sources, see sections 3.1d and 3.8.

Amount (-99 to +99)

Sets the modulation degree and polarity (positive or negative) from the previously-selected source.

Note: You can set the keyboard to non-transpose mode (i.e., the same note is played on any keyboard key). This is handy for some sound effects applications. To do this, set PMod1 to Keyboard and Amount to -99. All other modulation should be off. It is also possible to set alternate tuning scales; see Chapter 6 on Advanced Applications for further information.

Page 4 Parameters

PMod 2 Amount

These parameters perform the same functions as PMod1 and its associated Amount control. Thus, oscillator 1's pitch can be modified by two different modulation sources.

3.5 DCA1

The DCA module has two pages.

Page 1 Parameters

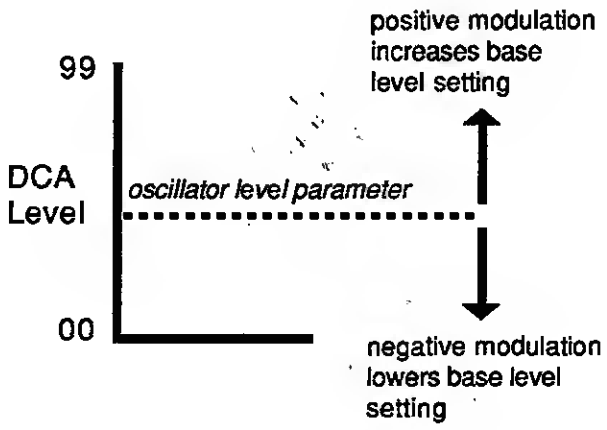
LMod1 (Off, Velocity, Keyboard, Pressure, Envelopes 1-4, LFO 1, LFO 2, Mod Wheel, Foot Pedal, External MIDI Control)

Chooses the DCA1 level modulation source. The Off setting by passes DCA1 (i.e., oscillator 1's level is set solely by the level parameter).

For details on modulation sousrces, see sections 3.1d and 3.8.

Amount (-99 to +99)

Sets the modulation degree and polarity (positive or negative) from the previously-selected source. This modulates the baseline level set by the oscillator's level parameter (see figure below).



How modulation affects the DCA level

Page 2 Parameters

LMod2 Amount

These parameters perform the same function as LMod1 and its associated Amount control. Thus, DCA1's level can be modified by two different modulation sources.

Applications using positive modulation amounts: Use Velocity as a modulation source to have levels track the dynamics of your playing; Keyboard to have notes become progressively louder as you play progressively higher up on the keyboard; Pressure to increase the oscillator level with increased keyboard pressure; Envelopes to create specific changes in dynamics over time; LFO to add tremolo effects; Mod Wheel to use the mod wheel as a volume control for the oscillator; Footpedal to provide foot-controlled volume; and External MIDI control to alter parameters via a particular MIDI continuous controller your keyboard or other MIDI data generator might send.

3.6 OSC 2 and DCA2

These modules have the same controls as OSC1 and DCA1 and are adjusted in the same manner.

Application using positive and negative modulation values: By using negative modulation with one oscillator and positive modulation with another, it's possible to do cross-fading between oscillators. **Example:** Set Osc 1's level to 00, DCA1's LMod 1 to Mod Wheel; and DCA1's Amount to +99. Set Osc 2's level to 99, DCA2's LMod 2 to Mod Wheel, and DCA2's Amount to -99. As you rotate the mod wheel away from you, Osc 1 will fade in while Osc 2 fades out.

You can also use envelopes to crossfade between wavesamples to "paste" an attack transient from one oscillator to the sustain section of another oscillator, thus creating a complex, animated sound that evolves over time.

3.7 FILTER

The filter module contains three pages.

Page 1 Parameters

Cutoff (00-99)

Chooses the filter's initial cutoff frequency. Progressively lower values remove progressively more harmonics, giving a duller sound; progressively higher values let more harmonics through, giving a brighter sound.

Note: Signals with complex harmonic structures are most affected by the filter.

Examples: A sine wave has virtually no harmonics (aside from those caused by the signal generation process) and you will not hear dramatic changes once the filter cutoff is higher than the note pitch. A harmonically-rich sample (like sax) will be affected greatly by the filter.

Resonance (00-99)

This sets the amount of gain at the filter's cutoff frequency. Higher settings give sharper, more "whistling" effects.

Page 2 Parameters

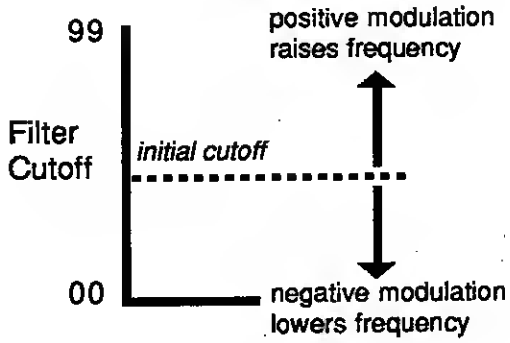
FMod1 (Off, Velocity, Keyboard, Pressure, Envelopes 1-4, LFO 1, LFO 2, Mod Wheel, Foot Pedal, External MIDI Control)

Chooses the Filter cutoff frequency modulation source. For details on modulation sources, see sections 3.1d and 3.8.

Amount (-99 to +99)

Sets the modulation degree and polarity (positive or negative) from the previously-

selected source. This modulates the baseline level set by the filter's cutoff parameter (see below).



Page 3 Parameters

FMod2 Amount

These parameters perform the same functions as FMod1 and its associated Amount control. Thus, the Filter cutoff can be modified by two different modulation sources.

Applications: Use velocity as a modulation source, with a fairly low cutoff value and positive modulation amount, to give a brighter sound as you play higher-velocity notes. This helps simulate the way acoustic instruments sound.

Use a footpedal as a modulation source, with a fairly low cutoff value and positive modulation amount, to produce wa-wa effects; or use breath control from a wind-to-MIDI converter to have harder blowing produce brighter sounds.

3.8 MODULATION MODULES

We'll now describe the parameters for the various modulation sources. However, note that six modulation sources have no variable parameters. We will discuss these first.

3.8a Keyboard Modulation Sources

These modulation signals are generated when you play a keyboard or other controller.

Velocity produces data relating to how fast a key goes from the key up (note off) to the key down (note on) position. This relates to the dynamics of your playing.

Note Position produces data relating to the note played on the keyboard. You would use this modulation source if you wanted a different sound in the upper and lower registers.

Pressure produces data relating to how hard you press on the keyboard after the keys are down. One way to use this would be to add vibrato, or increase brightness, as a note sustains.

3.8b Pedal

Many MIDI keyboards allow for adding a footpedal, which most manufacturers assign to controller 4 (however, some pedals are assigned to controller 7). Signals generated from pedal motion are converted into MIDI data within the master keyboard and sent out the MIDI out jack along with note data. **Caution:** The keyboard may offer options to disable or enable the pedal signals. Check your unit's manual to determine how to make the pedal output show up as part of the MIDI data stream.

3.8c Wheel

Most MIDI keyboards also include a modulation wheel, usually the right-most wheel of a pair of wheels located toward the left of the keyboard. This is virtually always assigned to controller 1. However, some keyboards include more than one mod wheel (in which case one or both will be assignable to different MIDI controllers), and some synthesizers use either a lever or joystick to provide modulation wheel signals.

3.8d External MIDI Control

Although many continuous controllers follow a specification that matches particular controllers with particular controller numbers (see Chapter 7, the MIDI supplement), there are often "wildcard" controllers or controllers other than standard ones such as pedal or mod wheel. **Example:** If you use a breath controller (number 2) and want it to control particular parameters, you could set the external control to 2 in the MIDI menu, then assign the desired parameters to controller 2.

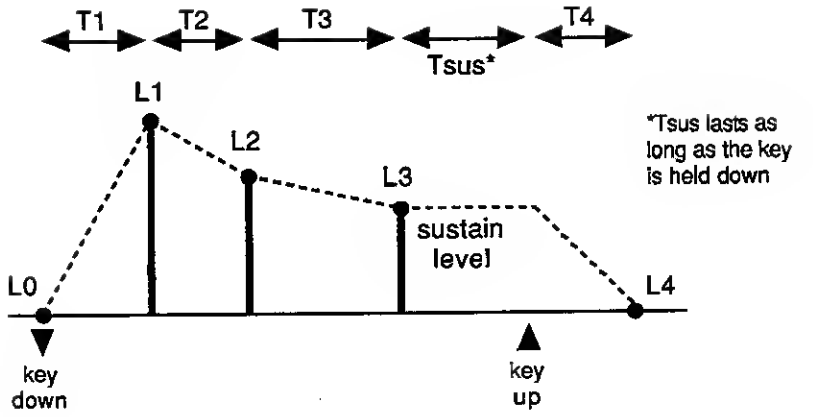
3.9 ENVELOPE GENERATORS

Envelope generators are such an important part of shaping a particular sound that we will first describe how envelope generators work and different types of envelope structures.

An envelope generator provides a modulation signal that varies over time. Applying it to different modulation destinations produces different results. **Example:** Sending the envelope to a DCA creates changes in level. If the amplitude decays over time, percussive effects (plucked strings, drums, etc.) will result; brass, woodwind, and some bowed instruments have amplitudes that increase over time. A note-on message triggers each envelope.

The DPM V3's envelope generators (ENV1, ENV2, ENV3, and ENV4) have four pages of parameters and are virtually identical, so we only need to cover how one envelope generator works. All envelopes have five Level and four Time parameters. The only difference between these modules is that one of ENV4's levels is not variable, as explained below.

The Time parameter determines the transition time from one Level to another. Levels and Times range from 0 (minimum level or time) to 99 (maximum level or time).

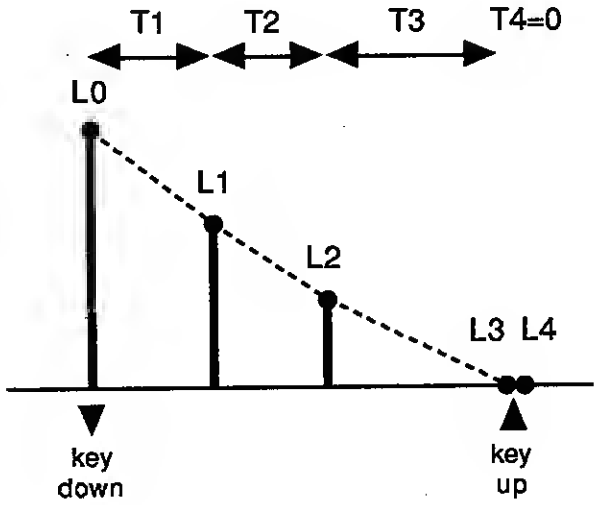


Basic envelope parameters

In the example above, L0 is set to 0. T1 determines how long it takes for the level to change from L0's setting to L1's setting. T2 determines how long it takes for the level to change from L1's setting to L2's setting. T3 determines how long it takes for the level to change from L2's setting to L3's setting.

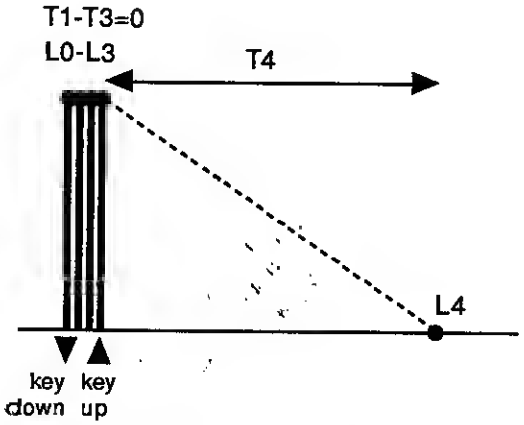
L3 sets the sustain level. This level remains as long as a key is held down.

Releasing the key kicks T4 into action. This sets the time it takes for the sound to change from L3's setting to L4's setting. Since Env 4 determines the overall dynamics by controlling AMPENV, L4 is fixed at 0 so that a note will always decay eventually to 0, or no sound. Otherwise, it would be possible to have notes that never shut off. Setting different levels and times can produce a variety of envelope shapes, as described below.



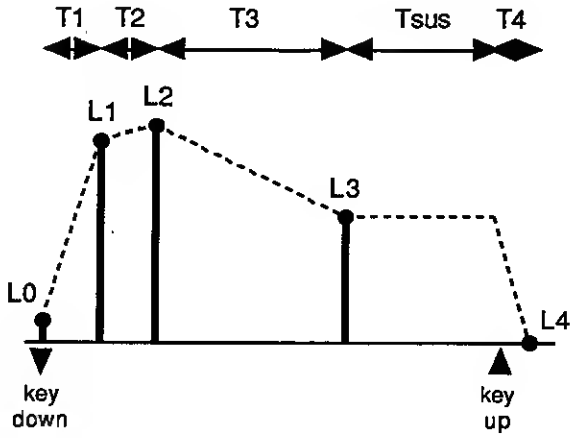
Percussive envelope

This percussive envelope decays for as long as you hold a key down. The envelope starts at the maximum, decays for time T1 to L1, decays for time T2 to L2, then decays for time T3 to L3. Because L3=0, there is no sustain time. Because T4=0, there is no release time if you lift your finger off the key before the decay has occured. For most percussive sounds, you'll want to add some release time. Typical L values (0-4): 99, 40, 20, 00, 00. Typical T values (1-4): 09, 09, 24, 00.



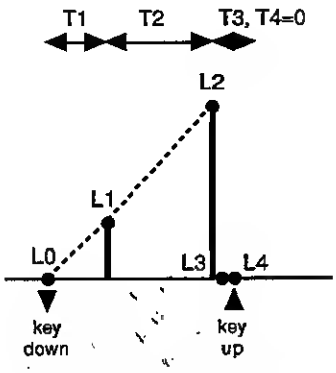
This is a different type of percussive envelope in that all you need to do is tap a key; the note will decay regardless of whether or not you keep your finger on the key. This is useful when synthesizing "struck" sounds, since, with something like a marimba, you hit the note once and it decays all by itself.

The key to this envelope is setting L0-L3 to 99 and T1-T3 to 0. When you tap a key, the envelope generator instantly jumps to L3 and since the key is also being released instantly, the release phase immediately starts and lasts for the time determined by T4.



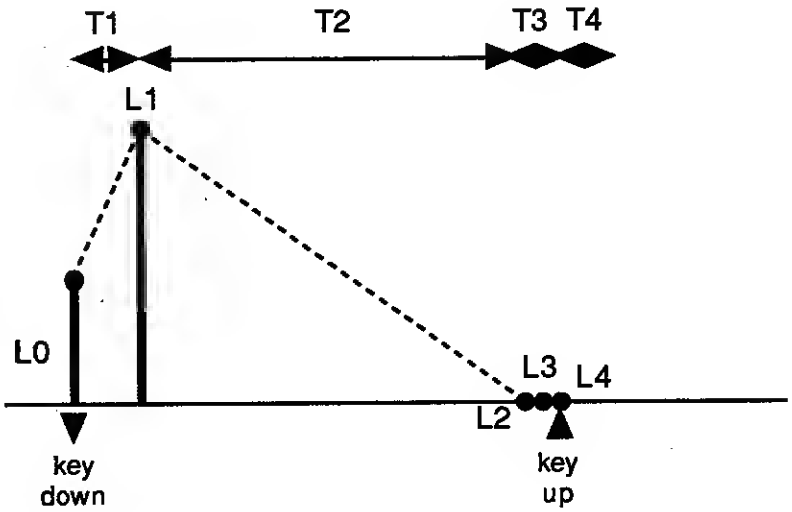
Wind instrument envelope

The figure at the bottom of the preceding page is a typical wind instrument envelope. It starts at a low level then rises over times T1 and T2 to a maximum level set by L2. Then there's a slight decay to L3, which sets the sustain level (sustain is needed here because a wind instrument will sustain for as long as you blow into it). Releasing the key brings in a slight release time. Typical L values (0-4): 10, 80, 99, 49, 00. Typical T values (1-4): 03, 03, 35, 03.



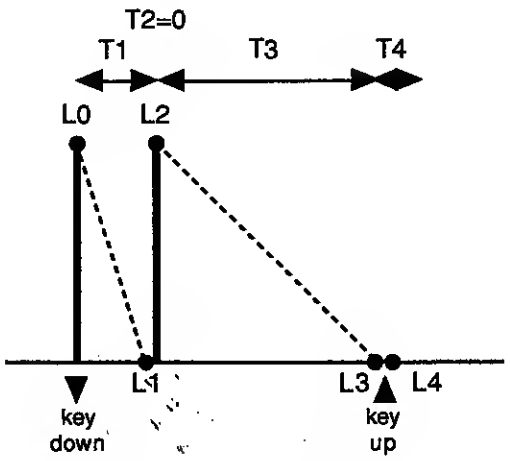
"Backwards tape" envelope

This is a "backwards tape effect" envelope. As long as you hold down a key, the note will increase in level until it reaches L2. Since T3 = 0 and L3 = 0, immediately after reaching L2 the envelope will go down to 0 and stay there. Setting T4 and L4 = 0 ensures that there won't be a release time if you release your fingers from the keys before the envelope reaches L2. Typical L values (0-4): 00, 33, 99, 00, 00. Typical T values (1-4): 15, 20, 00, 00.



This envelope is useful for bowed effects (such as cello) where you may want an attack time, yet also want to retain the initial "scrape" of the bow against the strings.

Setting L0 at a value other than 0 lets the envelope start at whatever level you want; the rest of the envelope decays slowly back to 0 for as long as you hold the keys down. Typical L values (0-4): 56, 99, 00, 00, 00. Typical T values (1-4): 20, 36, 00, 03.



Echo envelope

This final example shows an unusual "echo" envelope. The envelope decays from full down to 0, but then does another decay from full down to 0. Increasing T2 would creating more of a tremolo effect. Typical L values (0-4): 99, 00, 99, 00, 00. Typical T values (1-4): 02, 00, 15, 00.

Page 1 (LEVS) Parameters

Levels

The five level parameters (L0-L4) are variable from 0 (minimum level) to 99 (maximum level).

Page 2 (LEVS) Parameters

Velmod (-99 to +99)

Keyboard Velocity (Velmod) ties the envelope generator levels to velocity. The relationship between envelope levels is preserved; Velmod scales the levels rather than forces them to all jump to the same value.

With Velmod set to 0, the envelope levels will not be affected by velocity. Positive values increase the envelope levels according to your dynamics up the maximum preprogrammed levels. The higher the value, the lower the envelope levels go when you play softly. +99 gives the maximum dynamic range.

Negative values decrease the envelope levels according to your dynamics; the more negative the value, the more the envelope levels will tend to go toward 0 when you

play harder. -99 gives the maximum dynamic range.

Keymod (-99 to +99)

Keyboard Note Position modulation (Keymod) ties the envelope generator levels to keyboard note position. This is useful if you want a note's overall amplitude to depend on where you play it on the keyboard. The relationship between envelope levels is preserved; these changes scale the levels rather than force them to all jump to the same value.

A Keymod setting of 0 means that the envelope level will not be affected by where you play on the keyboard. With positive values, the levels will increase as you play from left to right on the keyboard. With negative values, the levels will decrease as you play from left to right on the keyboard.

Caution: The very highest C reacts strangely to Keymod parameters for reasons too complex to go in to here. For values +97 through +99, the highest C will produce minimum levels; for values -97 through -99, the highest C will produce maximum envelope levels.

Page 3 (TIMES) Parameters

Time Parameters

The four time parameters (T1-T4) are variable from 0 (minimum time) to 99 (maximum time).

Page 4 (TIMES) Parameters

Velmod (-99 to +99)

Keyboard Velocity (Velmod) ties the T1 envelope generator time to velocity.

A Velmod setting of 0 means that the envelope time will not be affected by velocity. If T1 sets an attack time (i.e., L1 has a lower value than L2), positive values increase the attack time as you play harder; negative values decrease the attack time as you play harder. The latter is more common, particularly for wind, voice, and other sounds which, when played forcefully, have a sharper attack.

If T1 sets a decay time (i.e., L1 has a higher value than L2), positive values increase the decay time as you play harder; negative values decrease the decay time as you play harder.

Keymod (-99 to +99)

Keyboard Note Position modulation (Keymod) ties T4 to keyboard note position. Since T4 specifies the release time, Keymod is most effective with percussive sounds.

Positive values increase the release time as you play higher up on the keyboard; negative values decrease release time as you play higher up on the keyboard.

The effect of Keymod increases drastically at longer delay times, so much so that notes at the extremes of the keyboard may appear to be stuck on, whereas in reality they just have an extremely long decay time. Set Keymod to lower values at first (e.g., -10 or +10, depending on how you want release time to track the keyboard) and try tweaking T4, the release time, to arrive at the desired decay curve. Go back and forth between T4 and the Keymod setting until you achieve the desired sound.

3.10 LFOs (LOW FREQUENCY OSCILLATORS)

The Low Frequency Oscillator (LFO) creates a cyclic (periodic) modulation of synthesizer parameters such as pitch, volume, or filter cutoff. Applying a periodic modulating signal to the oscillator produces vibrato; this is such an important application that the DPM V3 lets you control the LFO signal amplitude with the modulation wheel or a pedal, so you can add vibrato in real time as you play. The amount of vibrato (or other LFO-induced modulation) can also be set to a constant amount, or some combination of the two.

Applying LFO modulation to the VCA produces tremolo; modulating the filter cutoff with an LFO signal produces a wa-wa effect or, if used subtly in the higher registers, a shimmering type of sound.

The DPM V3 includes two independent LFOs, with five pages of parameters, as modulation sources. Since they are identical, we will discuss only one LFO's set of parameters.

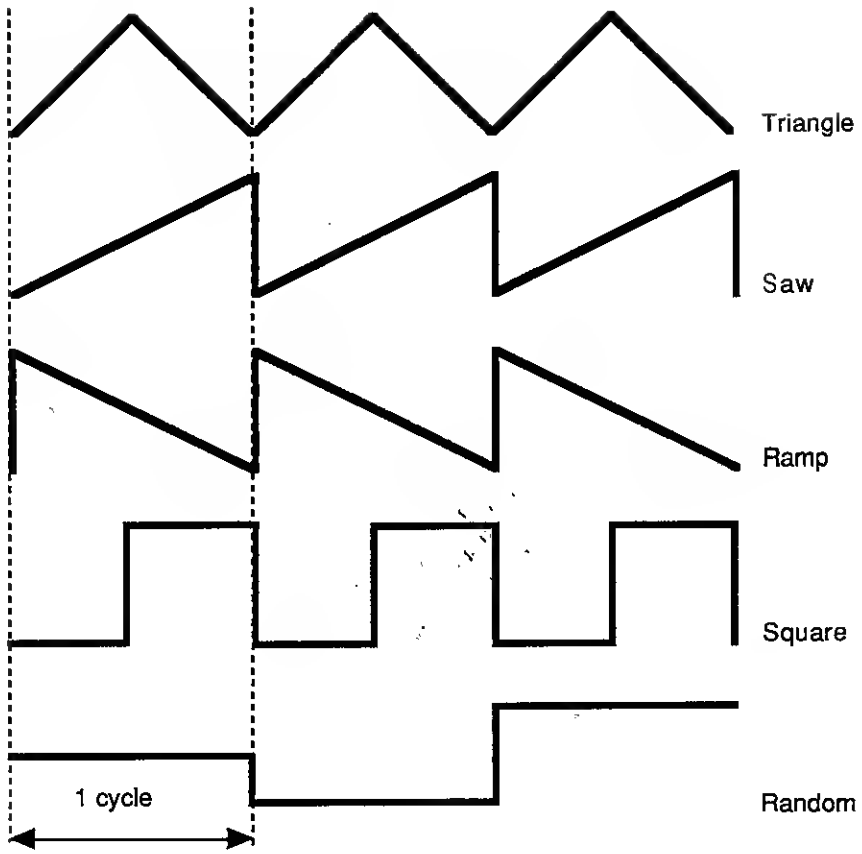
Page 1 Parameters

Rate (00-99)

Varies the LFO speed, from slow (0) to fast (99).

Shape

There are five LFO waveforms.



Tri (triangle): This produces rises and falls of equal time. Triangle LFO waveforms are commonly used for vibrato and tremolo.

Saw (sawtooth): This produces a rising waveform that, after reaching its maximum level, snaps back to zero and starts over again.

Ramp: This is the opposite of Saw in that a falling waveform, after reaching its minimum level, snaps back to maximum and starts over again.

Sqr (square): This waveform alternates between minimum and maximum values. It is useful for creating trills (and European-style police sirens if you're into sound effects).

Rndm (random): Each LFO cycle produces a randomly-generated level. This is good for sound effects and for adding slight randomized pitch variations to instruments such as trumpet, which seldom maintain a totally consistent pitch during playing.

Amount (00-99)

This sets the maximum signal level generated by the LFO, from minimum (0) to max-

imum (99). Since each modulation input can also vary the level received from a modulation source such as the LFO, this parameter may seem redundant. However, it can act as a "global" control. *Example:* Assume you've set up LFO routings to several modulation inputs, and decide you'd like to lower the overall LFO depth. Rather than re-adjust each modulation input setting, simply reduce this amount.

Page 2 (AMT) Parameters

AMod1 (Off, Velocity, Keyboard, Pressure, Envelopes 1-4, LFO 1, LFO 2, Mod Wheel, Foot Pedal, External MIDI Control)

Chooses the LFO amount modulation source. For details on modulation sources, see sections 3.1d and 3.8.

Amount (-99 to +99)

Sets the modulation degree and polarity (positive or negative) from the previously-selected source. This modulates the baseline amount set by the LFO's amount parameter on the first page.

Page 3 (AMT) Parameters

AMod2 Amount

These parameters perform the same functions as AMod1 and its associated Amount control. Thus, the LFO amount can be modified by two different modulation sources.

Applications: Use pressure to increase the amount of LFO modulation as you press harder on a key once it is down. This is very useful for adding expressive vibrato effects. Use the footpedal to provide foot-controlled LFO modulation.

Page 4 (RATE) Parameters

RMod (Off, Pressure, Mod Wheel, Envelopes 1-4, Foot Pedal, External MIDI Control)

Chooses the LFO rate modulation source. For details on modulation sources, see sections 3.1d and 3.8.

Amount (-99 to +99)

Sets the modulation degree and polarity (positive or negative) from the previously-selected source. This modulates the baseline rate set by the LFO's rate parameter on the first page.

Applications: Use an envelope to change the rate over time; a slight attack time will increase the rate.

Page 5 Parameters

Delay (00-99)

This delays the onset of modulation by an adjustable amount, from no delay (0) to maximum delay (99).

Ramp (00-99)

This is similar to delay, but sets a period of time over which the LFO modulation fades in (with delay, the modulation comes in at the programmed level after the delay period has elapsed). Using Ramp provides a very natural modulation effect with instruments such as strings and horns, as most musicians do not introduce vibrato immediately upon playing a note.

Note: Setting Delay greater than 0 deactivates the Ramp function.

Caution: If the LFO amount doesn't seem to add LFO, make sure LFO is selected as the modulation source for the parameter you want to vary.

3.11 OUTPUT

Volume (00-99)

This parameter sets the overall volume for single programs, or Link 1 of a Combi program (described later). Higher numbers give higher levels.

Pan (-99 to +99)

A program can be placed anywhere in a stereo (two-channel) field. -99 pans full left; moving toward 00 moves the program toward center. Moving toward +99 pans the program toward full right.

Bend (Off, Half, Whole, M3rd, Third, 4th, dm5th, 5th)

This determines how much the pitch of the two oscillators varies in response to pitch bend wheel travel. *Example:* If set to a whole tone, rotating the pitch bend wheel all the way away from you will increase the pitch by a whole tone, and rotating the pitch bend wheel all the way toward you will decrease the pitch by a whole tone.

Bend options are OFF, HALF (step), WHOLE (step), M3RD (minor third), THIRD (major third), 4TH, DM5TH (diminished or flatted fifth), and FIFTH.

3.12 PAN

In addition to the static pan setting available on the output page, the following two pages allow for pan position modulation.

Page 1 (AMT) Parameters

PMod1 (Off, Velocity, Keyboard, Pressure, Envelopes 1-4, LFO 1, LFO 2, Mod Wheel, Foot Pedal, External MIDI Control)

Chooses the pan modulation source. For details on modulation sources, see sections 3.1d and 3.8.

Amount (-99 to +99)

Sets the modulation degree and polarity (positive or negative) from the previously-selected source. This modulates the baseline pan setting in the Output page.

Page 2 (AMT) Parameters

PMod2 Amount

These parameters perform the same functions as PMod1 and its associated Amount control. Thus, the pan position can be modified by two different modulation sources.

3.13 OUTPUT MODE

The default setting is 2OUTPUT, which indicates that the program will feed the two Main outputs. If 6OUTPUT is selected, an additional parameter appears toward the right of the page that determines the output pair to which the program audio will be routed. Select either outputs 1+2 (Main), 3+4 (Sub 1), or 5+6 (Sub 2).

3.14 ABOUT COMBI PROGRAMS

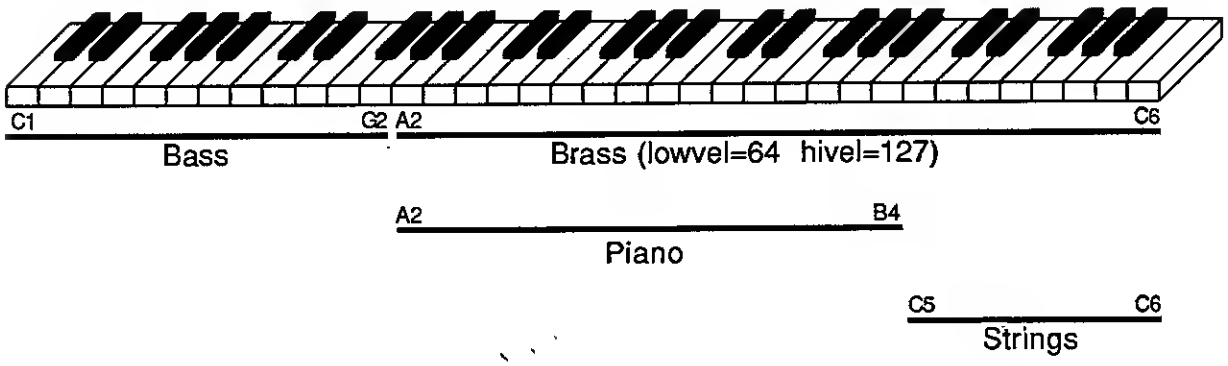
A Combi program lets you link up to four different programs to create split and layer programs. The first "link" is the original program chosen for the Combi program; the other three links can be any other programs within the DPM V3, which are specified as you program the Combi.

In a *split* program, certain sounds will cover only a certain range of the keyboard. A Combi allows up to four splits. *Example:* Acoustic bass in the lower two octaves and trumpet in the upper octaves lets you play trumpet melodies with your right hand against left-hand bass parts.

In a *layered* program, pressing down on a key will play two or more sounds simultaneously. A common example is layering strings and piano on one key. A Combi allows up to four programs to be layered.

The DPM V3 also allows combinations of splits and layers. The following figure shows a typical Combi "map" — Bass from C1-G2, Piano from A2-B4, Brass from A2-C6,

and Strings from C5 to C6. Strings are layered with the upper octave of brass; if you play in the range of C5-C6, you'll play both strings and brass. If you play from A2-B4, you'll play both piano and brass.



Furthermore, each link that makes up the split or layer can respond to a specific velocity range. One application would be to layer standard bass and slap bass sounds together, and have low velocity notes trigger the standard bass and high velocity notes trigger the slap sound. In the example above, Brass has been set for a low velocity of 64 and high velocity of 127. Thus, velocity values must be 64 or more to trigger the brass layer.

Each link can also be delayed, detuned, transposed, and have its own volume level. If you're starting to think this can make some really great sounds, well, you're right. Just remember that layered sounds use up more voices if they can be played simultaneously.
There are six Combi program pages. The last five are accessible only if program type (see **Page 1 Parameters**, next) is set to Combi.

Page 1 Parameters

Program Type (Single or Combi)

Select Single for standard programs or Combi if you want to link two or more programs together.

Page 2 Parameters

Link# (# equals 1-4)

This parameter chooses the link whose parameters will be set on this and other Combi pages. Link 1 is the original program found in the program's memory location. To choose the desired link, press the Right Arrow button and select the desired number.

Link# Program

Selects the desired program for the selected link, as shown on the bottom line. If no program is currently selected, the display will say ---OFF--- The first link cannot be changed, since it represents the original program.

Link# Volume (00-99)

Selects the link's volume level.

Page 3 (COMBI Link#) Parameters

LoKey (C-1 to G9)

This sets the low end of the link's keyrange. *Example:* To have a link play only in the range of C2-G3, set LoKey to C2.

HiKey (C-1 to G9)

This sets the high end of the link's keyrange. *Example:* To have a link play only in the range of C2-G3, set HiKey to G3.

Page 4 (COMBI Link#) Parameters

LoVel (000 to 127)

The selected link will not play if the note velocity is lower than this value. *Example:* To have a link play only if the velocity is between 064 and 127, set LoVel to 064.

HiVel (000 to 127)

The selected link will not play if the note velocity is higher than this value. *Example:* To have a link play only if the velocity is between 000 and 080, set HiVel to 080.

Page 5 (COMBI Link#) Parameters

DTune (-99 to +99 cents)

Adjusts the selected link's tuning in cents, from -99 (transposed down 99/100 of a semitone) to +99 (transposed up 99/100 of a semitone). Slight amounts of detuning add chorusing and flanging effects (these effects can also be created by the on-board signal processing).

TrPose (-24 to +24 semitones)

Transposes the selected link's frequency in semitone steps, from -24 (transposed down two octaves) to +24 (transposed up two octaves).

Page 6 (COMBI Link#) Parameters

Delay (000 to 990 ms in 10 ms increments)

The selected link will not start playing until the specified delay time has elapsed. This is useful for adding echo effects or having sounds with multiple attacks.

Chapter 4 — Programming the On-Board Signal Processors

4.1 ABOUT SIGNAL PROCESSING

The DPM V3's "secret weapon" in its sonic arsenal is a sophisticated complement of signal processing options, including time-based effects (reverb, chorus, flanging, stereo delay), equalization, and distortion. The results are comparable to what can be obtained from outboard rack-mount devices. Signal processing setups are not global; each program has its own signal processing parameters, so each program can be processed in a unique way.

Because of the depth of signal processing options, a few considerations should be discussed prior to adjusting any parameters.

4.1a Effects Structure

There are two independent effects (FX for short) units. Each one can include one or two effects (called Single or Dual effects), giving a possible total of up to four signal processing "modules" in all. The signal processing options (in addition to Bypass, where the effect module has no effect) are listed below, along with a brief description of each function.

Single Effects

Reverb: produces the type of ambient effects found in rooms and concert halls

Delay: produces echo unit effects, where a sound is repeated on a regular basis

Chorus: simulates the sound of instruments playing *en ensemble*, giving a thicker, richer sound

EQ: equalization; a type of tone control used to alter frequency response

Gate: this "gated" reverb effect similar to standard reverb, but with a more abrupt decay and more synthetic sound

Distortion: produces a fuzz effect that can create a dirtier, grittier sound

Exciter: adds a controlled form of distortion to enhance the "presence" of a signal plus a programmable equalizer

Dual Effects (these include two of the above single effects)

Reverb/EQ
Reverb/Distortion
Distortion/Reverb
Reverb/Chorus
Chorus/Reverb
Delay/EQ
Delay/Distortion
Distortion/Delay
Delay/Chorus
Chorus/Delay
Chorus/EQ
Chorus/Gate
Gate/Chorus
Chorus/Distortion

Distortion/Chorus	Exciter/Chorus
Chorus/Exciter	Reverb/Exciter
EQ/Gate	Exciter/Reverb
EQ/Distortion	Delay/Exciter
Distortion/EQ	Exciter/Delay
Reverb/Delay	Distortion/Exciter
Delay/Reverb	Exciter/Distortion
EQ/Reverb	Gate/Exciter
EQ/Chorus	Exciter/Gate

Note: Chorus effects can also provide flanging, a "swooping," jet airplane-like sound, with the proper parameter settings (described later). Also, remember that the previously-discussed modules offer many signal processing options — delay for one or more links in a Combi patch, tremolo by modulating a DCA with an LFO, etc.

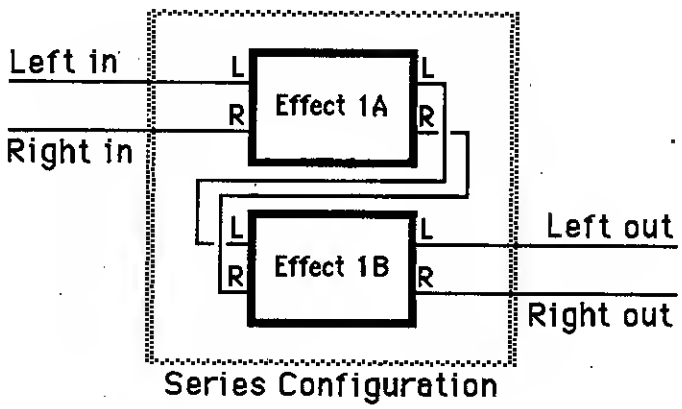
Important: Some combinations of effects, mostly those involving reverb, are not available because of the huge amounts of computer processing they would require.

Example: Both Effect 1 could be assigned to Reverb/EQ and Effect 2 to Delay/Chorus, but Effect 2 could not be set to Reverb/Chorus.

4.1b The Differences Between Effect 1 and Effect 2

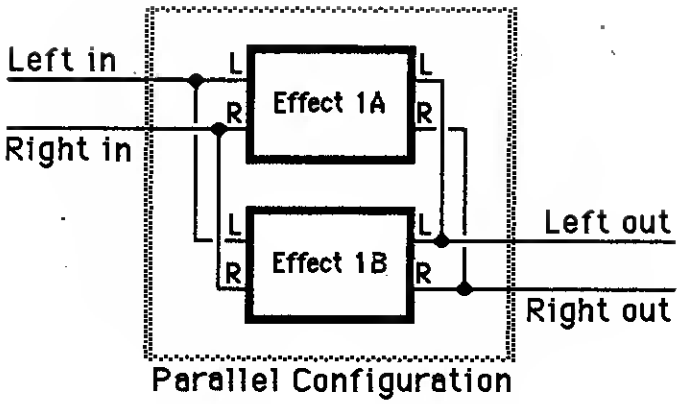
If Effect 1 includes a pair of effects (such as Reverb/Chorus), these can be configured in three different ways: Series, parallel, and dual.

The following figure shows the series connection. The stereo audio outputs feed Effect 1's first stage, which then feeds the second stage. The second stage provides the master stereo outputs and provides a master level parameter.



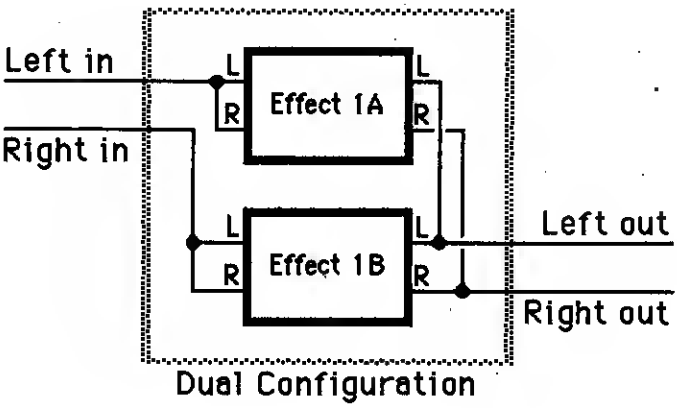
Series Configuration

The parallel connection routes the stereo audio outputs to both stages simultaneously; their outputs are then mixed together to provide the master stereo outputs. Each output has an associated level parameter.



Parallel Configuration

The dual connection feeds the left channel to one stage and the right channel to the other stage. Each effect synthesizes a stereo output, and these are mixed together into a master stereo output. Each output has an associated level parameter.

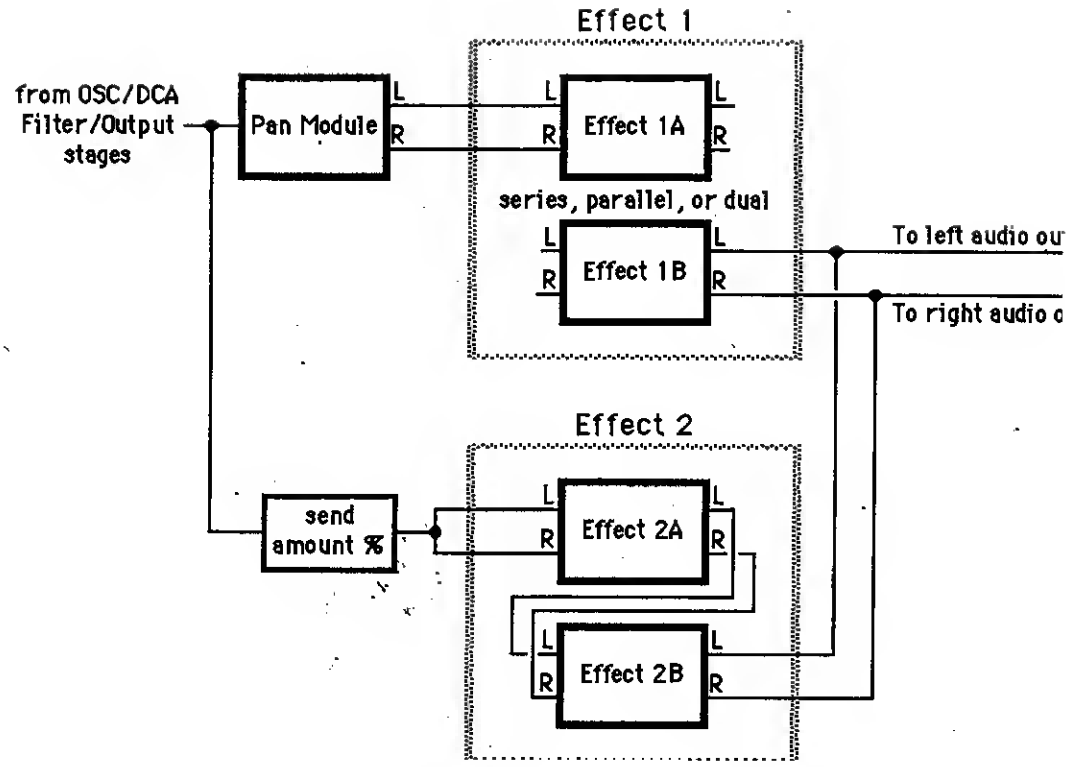


Dual Configuration

Effect 2 does not offer different configurations. If Effect 2 includes a pair of effects, these are always set up in series (in a manner identical to Effect 1 when it's set up in series).

However, Effect 2 does include a send control. This allows you to "send" some or all of the pre-panned program output to Effect 2. *Example:* You might want to add a very subtle amount of the exciter effect; set up Effect 2 as an exciter, then send a small amount of the program sound to Effect 2.

The following diagram shows how Effect 1 and 2 are configured. The diagram assumes that both Effect 1 and Effect 2 are set up as dual effects, yielding four effects in total. However, either or both could also be set up as single effects, or be bypassed if you don't want any effects at all. Note how the send parameter determines how much signal goes to Effect 2.



4.1c Signal Processors, Multi Configurations, and MIDI

Calling up a program calls up a particular set of signal processing parameters; but, what happens in a Multi configuration, where you have multiple programs?

The DPM V3, even when in a Multi configuration where different programs respond to different channels, nonetheless uses MIDI *base channel* information — the channel that would be selected if the unit was in MIDI Poly mode (the base channel is the first parameter in the MIDI menu). If a program in a Multi is set to the base channel, then its signal processing effects parameters will affect all programs that are part of the Multi.

If no program in a Multi is set to the base channel, then the DPM V3 will use whichever program parameters belong to the program that would be selected if the DPM V3 was not in a Multi configuration. *Example:* If you select Program 027, then switch over to a Multi, the effects parameters for Program 027 will still affect all programs that are part of the Multi.

The base channel is also important because sending a program change over the base channel to call up a different program will not only select that program, but also select the signal processing parameters associated with that program.

If this seems complicated, well, it can be if you want to use the signal processing options to their maximum potential. To get started, try working at first with single effects

to hear how they affect the sound. Then try different combinations to become familiar with the various possibilities.

4.1d Signal Processors and Output Mode Options

Effect 1 and 2 are not necessarily available all the time; this depends on the output mode. In 2OUTPUT mode (section 3.13), the Sub 1 and 2 outputs are inactive, and the two stereo effects processors will apply to the Main out signals. In 6OUTPUT mode, Subs 1 and 2 are dry, and the main outputs (1 and 2) are processed by Effect 1 (Effect 2 is inactive). Remember that each patch can have its own output mode setting; Multi configurations automatically switch the mode to individual outputs.

4.2 PROGRAMMING THE MAIN SIGNAL PROCESSING PARAMETERS

Here are the parameters you'll encounter as you scroll (using the Up/Down Arrows or Data knob) through the various signal processing module pages:

Effect #1 Config This selects the Effect #1 configuration (series, dual, or parallel).

FX1 Type This chooses an effect for Effect #1 from the different single and dual effects listed earlier.

L Stands for level. There will be one level parameter when Effect #1 is in a series configuration, and two level parameters for dual or parallel configurations.

The next several pages cover the parameters for the effect(s) chosen under FX1 Type. These parameters are discussed later.

Send This parameter is on the last page of each set of Effect 2 parameters and does not exist for Effect 1. It determines the amount of straight signal fed to Effect 2.

4.3 INDIVIDUAL EFFECTS PARAMETERS

4.3a Reverb Parameters

You'll find that different types of reverb sound best with particular types of signals. *Example:* "Smooth" reverb works well with percussive sounds, whereas "medium" reverb seems well-suited to piano sounds.

Page 1 Parameters

Type Select between Plate, Room, and Hall. Each provides a different reverb character.

Size Select between small, medium, large, huge, and smooth. This alters the apparent

size of the reverberant space.

Page 2 Parameters

Damp Determines the high-frequency "absorption" of the room by using a low-pass filter to simulate a more acoustically "dead" environment. Select from cutoff frequencies of 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, and OFF (full high frequency response).

Time Sets the length of the reverb "tail." Select from 0.0 to 8.0 seconds in 100 millisecond increments, and from 8 to 30 seconds in one second increments.

Page 3 Parameters

Mix Controls the mix of dry and processed (wet) signals. The display shows the effect name in the upper left and effect number in the lower left.

The variable mix parameter shows the ratio between dry and wet signals, as well as DRY for all-dry and WET for all-wet signals. The mix value affects only the wet/dry balance within the effect; it is independent of the mix levels for Effect 1 and Effect 2 (the L parameter described in section 4.2).

4.3b Delay Parameters

This is a stereo delay system with feedback. It's useful for slapback echoes, long echoes, and polyrhythmic echo effects (try setting one delay time to 67% of the other's delay time).

Page 1 Parameters

Time L Sets the left channel delay time, from 2.5 milliseconds to 250 milliseconds, in 2.5 millisecond increments.

Time R Sets the right channel delay time, from 2.5 milliseconds to 250 milliseconds, in 2.5 millisecond increments.

Page 2 Parameters

FdBak (00-99) Determines how much of the echo signal feeds back to the input for re-echoing. Higher values give longer echo "tails."

Mix Controls the mix of dry and processed (wet) signals. The display shows the effect name in the upper left and effect number in the lower left.

The variable mix parameter shows the ratio between dry and wet signals, as well as DRY for all-dry and WET for all-wet signals. The mix value affects only the wet/dry balance within the effect; it is independent of the mix levels for Effect 1 and Effect 2

(the L parameter described in section 4.2).

4.3c Chorus Parameters

Stereo chorusing thickens up a sound by delaying the sound by a small amount (generally less than 25 milliseconds), changing the delayed sound's pitch periodically with LFO modulation, then mixing the delayed and straight signals together. The various phase cancellations and additions that occur as the delayed and straight signals interact produce chorusing.

With many synthesizers, the recommended way to chorus is layering two identical sounds together and slightly detuning them. However, this cuts the available polyphony in half since two notes are layered on one key. The DPM V3 provides two chorusing methods that don't use up more voices in addition to the Effect 1 or 2 chorus effect, you can also assign the same sound to OSC1 and 2 in a voice, and slightly detune them.

If you're really wild about detuning, you can use the methods described above and create a Combi patch with two or more detuned layers.

Also, note that the chorus effect can be used for flanging, as described below.

Page 1 Parameters

Delay Sets the initial chorus delay time in 0.5 millisecond increments from 00.5 ms to 25.0 ms. Generally, the range of 12 to 25 ms is ideal for chorusing; 00.5 ms to 12 ms is a good range for flanging effects.

Rate Sets the periodic modulation rate from 0.0 Hz to 9.9 Hz, in 0.1 Hz increments. Use slower rates (e.g., 0.3 Hz) for flanging.

Page 2 Parameters

Depth (00-99) Varies the modulation amount from 00 (no modulation) to 99 (maximum modulation). Flanging usually sounds best with maximum modulation, a short delay time, and a slow modulation rate.

FdBak (00-99) Determines how much of the chorused signal feeds back to the input; more feedback creates a more intense sound.

Page 3 Parameters

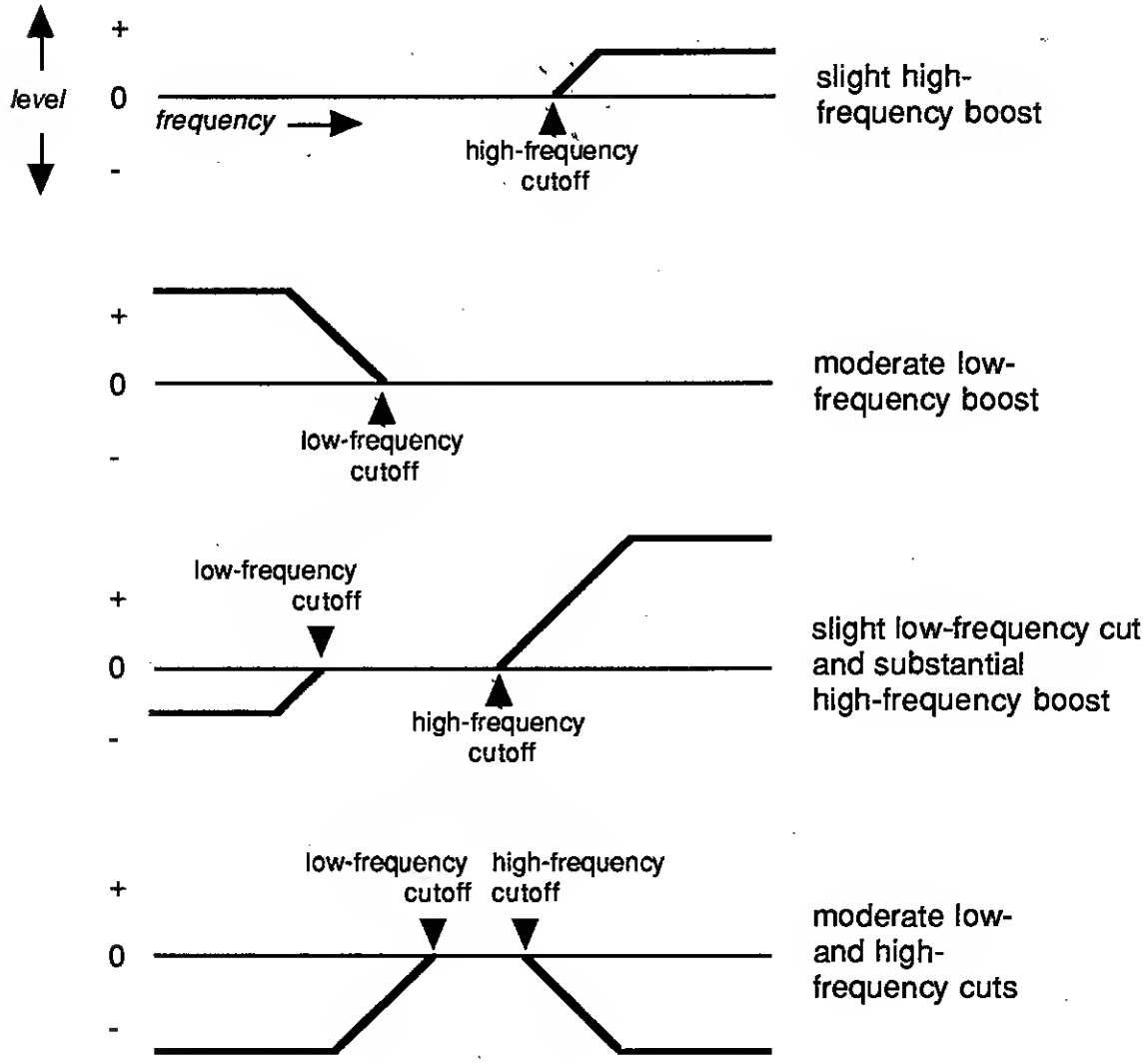
Mix Controls the mix of dry and processed (wet) signals. The variable mix parameter shows the ratio between dry and wet signals, as well as DRY for all-dry and WET for all-wet signals. The most intense chorusing and flanging effects occur with a 50:50 mix of dry to wet. Tilting the ratio toward dry (e.g., >50:50) puts the chorus or flanging effect more in the background.

The mix value affects only the wet/dry balance within the effect; it is independent of the mix levels for Effect 1 and Effect 2 (the L parameter described in section 4.2).

4.3d EQ Parameters

EQ alters a sound's frequency response. *Example: Boosting* the lower frequencies gives a bassier sound; boosting the higher frequencies gives a brighter sound.

The DPM V3's EQ is a two-channel, shelving type (so-called because the frequency response creates a "shelf" starting at the chosen frequency). The figure below shows some typical response curves available with the EQ.



Page 1 Parameters

Freq 1 This sets the low frequency cutoff. Options are 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, and 8 kHz.

Gain Sets the amount of boosting or cutting affecting the frequency chosen above, in 1 dB increments, from -12 dB (maximum cut) to 00 (no affect) to +12 dB (maximum boost).

Page 2 Parameters

Freq 2 This sets the high frequency cutoff. Options are 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, and 8 kHz.

Gain This operates identically to Gain on page 1.

Page 3 Parameters

Mix Controls the mix of dry and processed (wet) signals. The variable mix parameter shows the ratio between dry and wet signals, as well as DRY for all-dry and WET for all-wet signals.

The mix value affects only the wet/dry balance within the effect; it is independent of the mix levels for Effect 1 and Effect 2 (the L parameter described in section 4.2).

4.3e Gated Reverb Parameters

Gated reverb produces an effect which is similar to reverb, but has a sharper and more synthetic decay. It is frequently used with percussive signals to give more "punch," but is by no means limited to percussive sounds.

Page 1 Parameters

Type Chooses between three different gated reverb effects: Gate 1, Gate 2, and Gate 3.

Density (00-99) This determines the envelope shape of the reverb tail by altering the density of the early reflection patterns. Higher density settings give a longer tail.

Page 2 Parameters

Mix Controls the mix of dry and processed (wet) signals. The variable mix parameter shows the ratio between dry and wet signals, as well as DRY for all-dry and WET for all-wet signals. The mix value affects only the wet/dry balance within the effect; it is independent of the mix levels for Effect 1 and Effect 2 (the L parameter described in section 4.2).

4.3f Distortion Parameters

Distortion is useful for creating fuzz guitar sounds or for adding a bit of "crunch" to otherwise clean sounds, such as organ. **Note:** The Distortion/EQ combination effect is very useful, as you can use EQ to remove some high frequencies to make a "warmer" fuzz sound.

Page 1 Parameters

Amount (01-08) Chooses the distortion intensity; higher values create more distortion.

Mix Controls the mix of dry and processed (wet) signals. The variable mix parameter shows the ratio between dry and wet signals, as well as DRY for all-dry and WET for all-wet signals. The mix value affects only the wet/dry balance within the effect; it is independent of the mix levels for Effect 1 and Effect 2 (the L parameter described in section 4.2).

4.3g Exciter Parameters

The exciter effect is a mild form of distortion that gives a sound more impact. Generally, this effect is best when used subtly; try setting the Mix option for just a small amount of wet signal when you first experiment with this effect.

Page 1 Parameters

Freq (1.9, 2.1, 2.4, 2.8, 3.2, 3.8, 4.8, 6.4, 9.6, 19.2) (00-09) Higher values increase the brightness and complexity of the excited sound.

Contour (00-99) Higher values increase the depth of the Exciter

Mix Controls the mix of dry and processed (wet) signals. The variable mix parameter shows the ratio between dry and wet signals, as well as DRY for all-dry and WET for all-wet signals. The mix value affects only the wet/dry balance within the effect; it is independent of the mix levels for Effect 1 and Effect 2 (the L parameter described in section 4.2).

EQ The DPM V3 Exciter also contains a fully programmable 2 band equalizer, see EQ Parameters (4.3d) for details.

4.4 COMBINATION EFFECTS PARAMETERS

The combination effects use the same parameters as described above. *Example:* Reverb/Chorus presents the same parameters as the individual Reverb and Chorus effects.

The order of effects can make a big difference in the overall sound. As always, experimentation is the key to learning these differences, but following are some specific examples to get you started.

Distortion/Reverb and Reverb/Distortion Placing distortion before reverb gives a clean reverb effect superimposed on a distorted sound. Placing distortion after reverb distorts the reverb signal, giving a "dirty" reverb effect.

Delay/Chorus and Chorus/Delay Placing delay before chorus means that chorus will produce an overall modulation of the delayed sound. Placing chorus before delay produces a more diffused sound as the echoes repeat different parts of the chorused signal.

Distortion/EQ and EQ/Distortion With distortion before EQ, the EQ shapes the distorted sound. Placing EQ prior to distortion changes the character of the distortion by emphasizing or de-emphasizing those frequencies to be distorted.

Reverb/EQ and EQ/Reverb This is an example of a combination effect where the difference between the two options is not particularly noticeable; EQing reverb or reverberating EQ makes little practical difference.

Also, remember that you can obtain combination effects by using individual effects for Effect 1 and Effect 2. One very useful combination is assigning both effects to reverb. Due to the extensive computing power required to produce reverb effects, there is a noticeable periodic variation on long reverb tails. Using two reverbs set for different reverb times and equivalent levels can produce a much smoother sound.

Chapter 5 — Creating Drum Kits

5.1 DRUM KIT BASICS

The DPM V3 contains 10 special "multi-sample" presets called drum kits. These presets consist of up to 32 percussive (or melodic) wavesamples, chosen from the DPM V3's set of waveforms and assigned to specific keys. To prevent confusion with other wavesamples used in other programs, the 32 wavesamples used in a drum kit are called instruments.

Each instrument can be assigned to a particular range of MIDI notes, with individual tuning, amplitude decay, level, pan, and output assignment parameters. After building a drum kit, it remains in memory until altered and can be assigned to a program, just like any other wavesample. However, there are some differences, because the DPM V3's program voice architecture is modified for drum kit construction.

- Drum Kits should only be assigned to oscillator 1.
- The following modules are removed from the signal path: Oscillator 2, DCA1 and DCA2, ENV2 and ENV3, LFO1 and LFO2. ENV1 can be adjusted, but has no effect on the sound. Drum kits are not affected by pitch bend. The main parameters to adjust in the program itself are the Filter and ENV4 Velmod and Keymod parameters.
- The program output mode is 6OUTPUT to accommodate the kit output assignment and panning positions.
- The drum kit pan assignment overrides the program's output pan parameter.
- The drum kit output level overrides the usual program output level parameter.
- The AMPENV (controlled by ENV4) is active, but with release time set by the drum kit decay parameter.
- Velocity sensitivity should be assigned using the VelMod parameter in the ENV4 menu.

Although most people are interested in the DPM V3 because of its instrument sounds, don't overlook the drum kit options. The DPM V3 can serve as an excellent drum expander module; even if you already own a drum machine, creating a DPM V3 drum kit with similar sound and key assignments to that of the machine and triggering the two sound sources simultaneously, can make a really huge drum sound.

5.2 ACCESSING AND MODIFYING THE DRUM KIT PARAMETERS

The general procedure is to:

1. Press the GLOBL master button.
2. Select the KIT#/Ins/Wave/Key page.
3. There are three pages of drum kit parameters, described below.

Page 1 Parameters

KIT# (0-9)

Select a kit number into which you will program the various instruments.

Ins (01-32)

This selects the instrument number to which parameters will be assigned.

Wave

This chooses from any of the available DPM V3 samples, whether in ROM or user RAM. You are not limited to the traditional drum sound samples.

Key

Each instrument is assigned to a specific key range. This parameter sets the upper note of the range; the lower note of the range is one semi-tone higher than the highest note of the previously selected instrument. *Example:* If Instrument 01 covers the range of A0-D1, and Instrument 02's Key parameter is set to G1, then Instrument 02's range is D#1-G1.

If you assign a drum sound "between" existing drum sounds, the existing sounds will be reordered to accommodate the new sample. In the example given above, if you assigned Instrument 03 so that the top key is F1,
Instrument 01 would cover the range of A0-D1, Instrument 03 would extend from D#1 to F1, and Instrument 02 would cover F#1-G1.

Note: An initialized drum kit assumes that you are going to build the drum kit starting from the top of the keyboard and work your way down, so all keys are set to C-1. If you want to build a drum kit starting from the bottom of the keyboard and work your way up, you might want to set all keys initially to G9.

Page 2 Parameters

I## (01-32)

This lets you choose a particular instrument for parameter adjustment so you don't have to keep jumping back to Page 1 to select an instrument.

Tune (-36 to +36 semitones)

Adjusts the instrument's frequency in semitone steps, from -36 (transposed down three octaves) to +36 (transposed up three octaves).

Decay (00-99)

Sets the instrument's decay time by altering the ENV4 decay parameter (T4).

Level (00-99)

Determines the instrument's level. Higher values give higher levels.

Page 3 Parameters

I## (01-32)

This lets you choose a particular instrument for parameter adjustment so you don't have to keep jumping back to Page 1 to select an instrument.

Pan (-99 to +99)

An instrument can be placed anywhere in a stereo (two-channel) field. -99 pans full left; moving toward 00 moves the program toward center. Moving toward +99 pans the program toward full right.

Output (1+2, 3+4, 5+6)

Sends the instrument to one of the three available output pairs, if 6OUTPUT mode is selected for this preset.

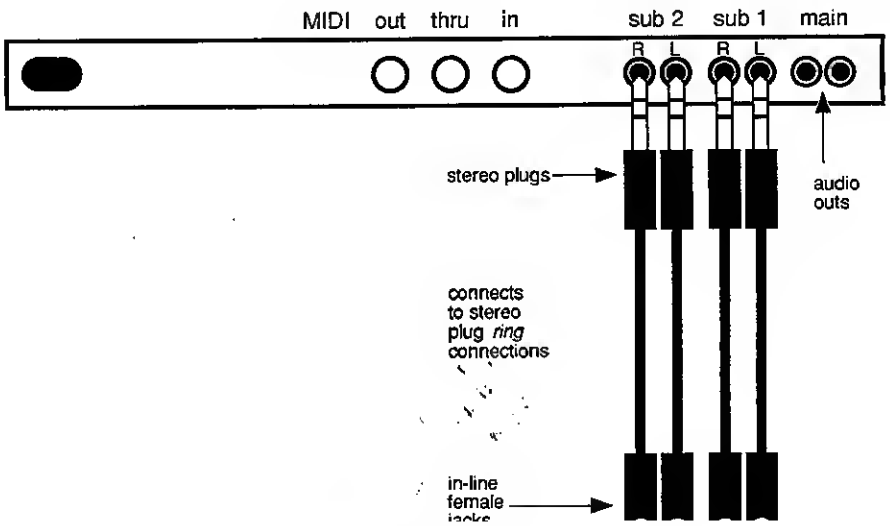
Application: This is handy if you want to process, for example, the kick and snare using external signal processors. Arrange all the other drums as desired in the stereo field and assign them to outputs 1+2. Pan the kick full left and assign to 3+4; pan the snare full right and assign to 3+4. The kick will appear at output 3 and the snare at output 4. These outputs can then be routed to signal processors, whose outputs go to a stereo mixer where they can then be panned as desired in the stereo field.

Fx2 (00-99)

Sends the instrument signal to Effect 2 (see Chapter 4 on signal processing), if 2OUTPUT mode is selected for this preset.

Application: This is useful if you want an overall drum effect but also a different effect on an individual drum. Effect 1 would provide the overall drum processing; Effect 2 the effect for the particular drum.

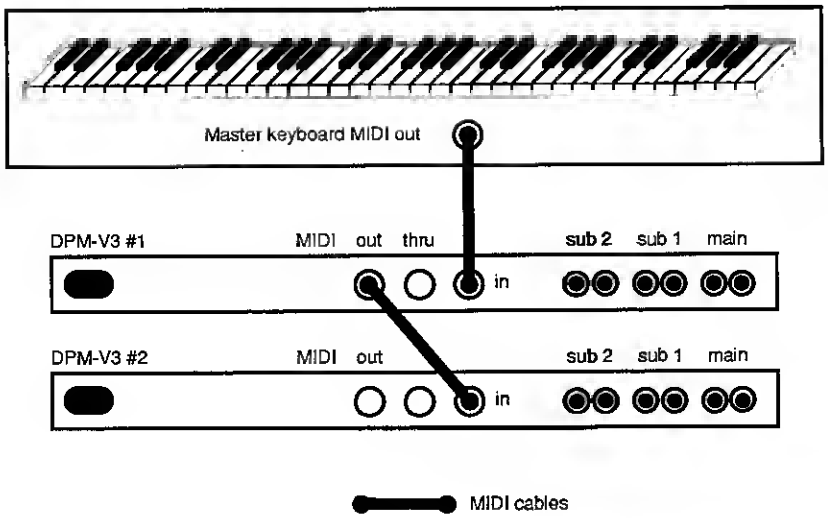
If you run out of inputs to your main mixer, the ring connections for Subs 1 and 2 can provide sub-mix inputs for other pieces of gear. Up to four inputs are available. These signals are mixed within the DPM 3 and show up at the Main outputs. Of course, this disables Subs 1 and 2 for normal operation.



6.2 MIDI OVERFLOW MODE

The second page of MIDI parameters includes one called Ovf (overflow), which can be either off or on. Overflow lets you chain two DPM V3s together to double the number of voices, from 16 to 32 (or chain three DPM V3s together if you want 48 voices). If the first DPM V3 in the chain runs out of voices, it assigns any "overflow" notes to the next DPM V3 in the chain rather than steal existing voices in the first DPM V3.

The following figure shows how to hook up two DPM V3s to double the number of voices. Remember that Ovf must be on in the appropriate MIDI menu page for this feature to work.



6.3 LOADING NEW SAMPLES INTO THE DPM V3

The DPM V3 oscillators play back sampled sounds that were recorded, digitized, and stored in ROM (permanent memory) chips by Peavey for use in the DPM V3. However, it also can include up to 1 Megabyte of battery-backed up RAM, which allows you to load in your own samples via MIDI. This takes advantage of a part of the MIDI specification, the Sample Dump Standard (SDS), which specifies a universal way to exchange samples between those instruments whose specifications conform to the SDS. Unfortunately, not all samplers are SDS-compatible and many use their own methods of data transfer. Furthermore, for CD-quality fidelity the DPM V3 is a 16-bit machine; it therefore requires that samples be sent as 16-bit data. Check your sampler's manual to see if it can transfer samples according to the SDS 16-bit standard. If not, you will not be able to transfer samples directly between the sampler and DPM V3.

Fortunately, there is a convenient workaround. Sample-editing software programs (such as *Sound Designer* and *Alchemy* for the Macintosh, *Avalon* and *Genwave* for the Atari, *Sample Wrench* for the Amiga, and *Samplevision* from Turtle Beach Systems) exist for virtually all popular computers. These programs can transfer samples between the computer and those samplers supported by the program, regardless of whether or not they support SDS. The program should also be able to translate samples that use incompatible formats. Therefore, a non-SDS sample can be brought into the program, translated, and sent out over MIDI as an SDS sample to the DPM V3, thus opening up a potentially huge library of samples.

There are two main ways to transfer samples to and from the DPM V3:

- Sending samples to the DPM V3, such as from a sample-editing program or sampler capable of sending samples as SDS data.
- Having the DPM V3 request a particular sample (as identified by a number) from a sample-editing program or sampler capable of sending samples as SDS data.

Loop and sample length parameters in the source sample are retained in the DPM V3.

6.3a Sample Organization Within the DPM V3

A single sample that covers the entire keyrange will show up in the Oscillator 1 and 2 menus like any other wave, at the end of the factory waves. However, stretching a single sample over the entire keyboard range is often sonically unsatisfactory — the timbre resembles Darth Vader at the low end and the Munchkins at the high end due to excessive transposition (like varying the speed control on a tape recorder by a large amount). Therefore, the DPM V3 allows for *multi-sampling*, where several samples (perhaps at octave or fifth intervals) are used to cover the keyboard range. Because each sample only needs to be transposed over a narrow range, the timbre is more realistic.

For maximum user convenience, these multi-samples are still saved as a single wave. For example, a multi-sampled guitar will show up as a single Guitar wave. (Of course, you can save each sample individually and assemble them in a Multi patch, but there is seldom any advantage to doing things this way.)

The sample function lets you load, catalog, delete, and name samples. The DPM V3 holds up 32 sampled waves and 48 individual samples (some waves will probably be multi-sampled, hence the ability to load in more samples than there are waves). Attempting to load more than 48 samples or 32 waves will produce an error message in the display.

Important note: Different samples are often taken at different sample rates, with lower sampling rates trading off poorer fidelity for greater memory efficiency. In many sample transfer applications it is important to match sample rates, but the DPM V3 performs an automatic sample rate conversion routine to ensure compatibility. This process does not alter the sample length, which will be the same in the DPM V3 as in the source. Also, please note that sample rate conversion cannot improve the sound of a sample originally recorded with a low sample rate. The DPM V3 will faithfully reproduce whatever you put into it; put in a horrible-sounding sample, and the DPM V3 will play back a horrible sample.

6.3b Loading/Requesting Samples

1. Connect a MIDI cable from the DPM V3's MIDI out to the MIDI in of the computer or sampler providing the sample to be loaded.
2. Connect a MIDI cable from the DPM V3's MIDI in to the MIDI out of the computer or sampler providing the sample to be loaded. These MIDI connections must be made to provide two-way communication (handshaking) between the DPM V3 and sampler/computer.
3. On the first page of the MIDI menu, select the base channel over which you want to transfer the sample, and select Omni or Poly mode.
4. After making your selection, press the Up Arrow button to select the Sample RAM page. If nothing has been stored in memory yet, the display will show 0 bytes used and the amount of free memory. In a fully expanded DPM V3, this is 1048576 bytes (1 megabyte).
5. Press the Up Arrow button to select the next page, SDS Load.
6. Press the Right or Left Arrow button so that the bottom line flashes. Select Remote if you want to send a sample to the DPM V3 from a computer or sampler, or Request # if you want to "grab" a particular numbered sample from a computer or sample and have it loaded into the DPM V3. With the latter choice, there will be a flashing number toward the right of the display. Use the Up/Down Arrow buttons or Data knob to choose the desired sample number (0-16,383). Note that it is often simplest to select Remote and send a sample to the DPM V3.

7. After selecting the desired data transfer mode, press Exec. Note the [EXEC] in the display's upper right corner, indicating that you must press Exec to finalize the selection process.
8. If the DPM V3 was set to request a sample, the dump process should begin automatically. It may take a couple of seconds after sending the request for the sampler or computer to respond; this is normal. If there is no response, make sure that the sample source and DPM V3 are set to the same MIDI channel, and that the correct sample number was specified in the request process. If the DPM V3 was set to Remote, continue reading; otherwise, skip to step 11.
9. After selecting Remote and pressing Exec, the display says "Waiting for SDS dump on MIDI channel 1" (or whatever base channel you chose in step 1).
10. Initiate a sample dump (transmission) at the computer or sampler, which must be set to the same basic channel as the DPM V3.
11. The display will say Sample Dump and show a countdown of how many bytes remain to be transferred into the DPM V3. Note that MIDI sample transfers can take quite a while with long samples; be patient.
12. Shortly after the display says "dump complete," select the base note (root pitch) and high note of the sample's range. The DPM V3 assumes that you will load in samples from the low end of the keyboard to the upper end, so the first sample will automatically default to a low note of A0 and high note of G9. If you are not multi-sampling, press Exec and skip to step 14.
13. If you are multi-sampling, press Exec and the SDS Load display will appear again. Repeat steps 6-12, but note that in step 12, the range's low end will default to one semitone above the high end of the previous sample's range, and the high note will be G9. Set the high note as desired. Repeat this procedure for as many multi-samples as you need to build up a complete sound, then press Exec.

    Note: Once the high note is assigned to G9, there is no more room to add samples. As a result, the DPM V3 will assume that if the highest sample range extends to G9 and you press Exec, you are finished transferring the multi-samples for a particular wave. Also, note that when sending a sample to the DPM V3, the computer program or sampler may ask you to specify a sample number. If this is the same as the one you just transferred, it will wipe out the one you transferred. Specify a new number for each sample you send.
14. Once sampling for a particular wave is complete as indicated by your pressing Exec, the DPM V3 will automatically select the Wave Name page. Use the Arrow buttons and data knob to give a six-character wave name. This is the name that will appear along with the other DPM V3 waves. Press Exec when you're done.
15. The display now shows the amount of memory that has been used.

    Note: With multi-samples, the name you give is in addition to a wave number assigned by the DPM V3. Multi-samples will share the same wave number; subsequent multi-samples will share a wave number also, but this will not necessarily be the next higher number because multi-samples reserve consecutive numbers even if they share a common wave.

Confused? An example should help. Suppose you load three waves into memory; the first has three multi-samples, the second has five multi-samples, and the third, two multi-samples. With the group of three multi-samples, each sample is called WAVE01 but the three samples reserve spaces WAVE01-WAVE03. With the next group of five multi-samples, each sample is called WAVE04; since samples WAVE04-WAVE08 are reserved by the five multi-samples, the next group of wavesamples is called WAVE09.

6.3c SDS Audition

If you call up the Edit menu after loading a sample, the buffer will contain a special program called SDS Audition. This provides a default patch that has the just-sampled wave loaded into Oscillators 1 and 2 so that you can listen to the patch and decide whether the sampling process was successful.

6.3d Scanning the Sample Directory

Once the DPM V3 contains samples, going past the SDS Load page calls up the Sample Dir (Directory) page. The only variable parameter is the Sample #. This catalogs each sample in the DPM V3, and shows the associated Wave name and size in bytes.

6.3e Deleting Samples

Because samples are loaded into battery-backed RAM, it is necessary to delete a sample to create more room for new samples. The next page past the sample directory lets you choose samples for deletion.

Press the Right Arrow button and select the desired sample. The display will show the associated Wave name, size in Kbytes, and keyboard range. Continuing to scroll past the last sample chooses All if you want to delete all samples. After choosing the sample to be erased, press Exec.

To delete all samples in a multi-sample, press the Right Arrow button again and the Wave name (upper line) will flash. Choose the desired wave and press Exec to delete.

6.3.f Transmitting Samples

Samples can be transmitted from the DPM V3 to other SDS-compatible devices. This page comes after the Delete page. The protocol is the same as deleting samples, except that when you press Exec, the sample is sent over MIDI instead of deleted.

6.4 ALTERNATE TUNING TABLES

The subject of alternate tunings is a fascinating one that's steeped in history. The even-tempered scale that is almost universally used in western music is a comparatively recent invention; prior to that, other types of tuning predominated, and non-even-tempered scales are still used in many parts of the world.

The even-tempered scale is particularly useful in harmonically complex music that modulates a lot. This is because the even-tempered scale breaks an octave down so that multiplying one frequency by the twelfth root of 2 gives the frequency of the next higher-pitched semitone. This means that the pitch difference ratio between each semitone is constant, thus allowing for easy transposition.

However, the twelfth root of 2 is an irrational number. Without going into a lot of convoluted math, this means that the even-tempered scale contains small tuning errors compared to theoretically "perfect" scales, such as just intonation. Just intonation bases its tunings on ratios of whole numbers, with an implied preference for small number ratios such as 32, 56, etc.; this ensures that all notes within a given scale are perfectly in tune with each other. However, again for reasons beyond the scope of this manual, transposition into keys other than the one for which a just tuning is optimized can create intervals that are audibly out of tune.

Prior to the days of computers, cultures that used just intonation tended to stay within a particular key due to the difficulties of modulation. However, considering that it is possible to shift pitch electronically via transposition, this is no longer as much of an issue. *Example:* Suppose you set up a program in just intonation. You can play in the key of C and have perfect intonation. To modulate, copy the program to another program, and transpose it to the key to which you want to modulate. When you want to modulate, select the copied program, but *continue playing as if you were playing in the key of C.* This will allow for alternate tunings and modulation. You could use a sequencer to send out program changes that select different programs and accomplish automatic modulation as you continue to play in the fingerings used in the key of C.

Alternate tuning is considered one of the final frontiers of contemporary music-making. Some people feel that purer forms of tuning, such as just intonation, are more beneficial to the mind and body than even-tempered intervals, which are inherently out-of-tune and therefore grate, albeit subconsciously, on the ear/brain combination. Is this just hype? Or did we really lose an important element of music by adopting the even-tempered scale? Experiment and draw your own conclusions.

The DPM V3 includes three "standard" alternate tunings as well as two user-settable scales. For more information on alternate tunings, check out the following books:

Lou Harrison's Music Primer (Harrison, Lou; C.F. Peters Corp., 1971)
On the Sensations of Tone (Helmholtz, Herman; Dover, 1954)
Genesis of a Music (Partch, Harry; Da Capo Press, 1974)

There is also a newsletter, *1/1*, published by the Just Intonation Network. For more information or a free sample issue, write to JIN, 535 Stevenson St., San Francisco, CA 94103. Finally, the October 1987 issue of *Electronic Musician* magazine was a special issue featuring numerous articles on alternate tuning theory and techniques.

6.4a Selecting a Preset Tuning Table

1. Press the GLOBL master button.
2. Select the GLOBAL Scale Type page.
3. Select the desired scale type EQUAL (even-tempered), JUSTMaj (major scale just intonation), JUSTMin (minor scale just intonation), MEANC (mean tone tuning, key of C), USER1, and USER2 (the latter are user-programmed scale; see below).

To hear the difference between just and even-tempered scales, play an interval of a third or sixth with the EQUAL scale type. Now play the same interval using JUSTMaj. It will probably sound out of tune at first, but listen for a while then switch back to EQUAL; this scale will now sound out of tune, because, in actuality, the third and sixth are slightly sharp compared to what they should be in theory.

6.4b Creating Your Own Tuning Tables

You can also create two custom tuning tables for particular ethnic scales, such as Indian ragas.

1. Press the GLOBL master button.
2. Select the USER Tuning page.

There are three parameters on this page:

(1 or 2)

Selects user scale 1 or 2.

Note (C to B)

This selects the note of the octave to be tuned. The tuning specified in this octave is repeated in other octaves.

Tuning Offset (-99 to +99 cents)

The selected note can be detuned over a range of -99 to +99 cents.

6.4c Alternate Even-Tempered Tunings

In addition to the options mentioned above, it is possible to set the DPM V3 for a variety of alternate even-tempered tunings that include different numbers of notes per octave, such as quarter-tone and eighth-tone scales. These types of scales may not push your buttons from a melodic standpoint, but they are very helpful when creating sound effects; after all, car crashes and door slams are rarely equal-tempered. On the other hand, a 17-tone scale can be musically useful, assuming you find some comfortable keyboard mapping for it.

The key to this technique is to use Keyboard as the oscillator PMod and scale it ap-

propriately. Make sure that the tuning table is set to EQUAL (section 6.4a). Here are some possibilities:

¼ Tone Tuning Set PMod to keyboard and Amount to -50. Set the Coarse tuning to -14 and Fine to +50.

1/8 Tone Tuning Set PMod to keyboard and Amount to -75. Set the Coarse tuning to -21 and Fine to +75.

17-Tone Tuning (C3 to F3 covers one octave) Set PMod to keyboard and Amount to -29. Set the Coarse tuning to +08 and fine to +17.

Other variations will give other tunings.

6.5 SUPER STEREO EFFECTS

Combis preserve the stereo panning of the patches within the Combi, which allows for some hot stereo effects. To check this out, create two different single patches that play the right and left versions of a sound (e.g., Trumpet L and Trumpet R, with each panned appropriately). Now call up Trumpet L and make it a Combi patch, with Trumpet R being another patch in the Combi. You now have a patch with separate signals in the left and right channels. Try turning on the delay line for one of the sounds, set for 20 to 40 ms. This should spread out the sound even more.

If you don't want to use up two programs, there is a workaround that can get a nice stereo spread from a single program. Call up a program and set it to Combi. Now call up the same program again for the second program of the Combi. If you select the panning parameter, this will affect the base program only and not the second program, allowing you to pan them to opposite sides of the stereo field. You can make any other modifications you want to the base program — set delays, change LFO, etc. The only catch is that if you save the program, the second program will immediately adopt whatever changes you made to the base program. This does work well, though, if you simply want to turn a sound into a wider stereo image: Create a Combi with the two patches, then set panning and delay as needed when you call up the patch.

Speaking of the delay line, try setting it to a time that falls in with the beat of the music (e.g., a quarter-note delay, or eighth-note triplet) and play one of these stereo patches. The sound will bounce back and forth in stereo, in a rhythmically interesting way.

6.6 BLANK "TEMPLATE" PATCHES

When creating programs from scratch, you can always use an initialized preset. However, you can save time by reserving some programs as template patches (with

300 available programs, you have the space!). These can be "generic" wind, plucked, percussion, and string patches which can serve as a point of departure for related programs. *Example:* The generic wind patch can provide a good foundation for creating sax, clarinet, trumpet, oboe, and similar sounds.

6.7 PROGRAMMING/EDITING IDEAS

Here are some techniques you might want to try to spice up your patches.

Pressure-controlled pitch This is just the thing for guitar patches when you want to press on the keys and get pitch bending. Also, use this with acoustic bass patches to give more of a "fretless" feel.

Envelope-controlled pitch effects Adding a slight amount of upward pitch bend to wind instrument and vocal patches can increase the realism of the sound.

Using velocity with amplitude and filtering It is often not sufficient to use just velocity to vary the dynamics of a signal. Although this varies the level, with "real-world" instruments timbre usually changes in response to dynamics as well. Having higher velocity values raise the filter cutoff slightly can create a much more realistic effect.

Other pressure tricks Pressure is excellent for crossfading between two different sounds, such as a straight guitar sound and a "feedback" guitar sound an octave higher. Assign the same sound to both oscillators; on DCA1, use pressure as a modulator with amount equal to -99 and level equal to 99. On DCA2, again use pressure as a modulator; but this time, set the amount equal to +99 and level equal to 0. Increasing pressure will fade out DCA1 and fade in DCA2.

Another common application for pressure is to add vibrato or tremolo after a note is held down.

The advantages of dual LFOs When creating orchestral string patches, remember that in a real orchestra each player's vibrato will be at a slightly different rate. Therefore, modulate one oscillator with LFO1 set to a particular frequency, and modulate the other oscillator with LFO2 set to a slightly different frequency. This helps create a more randomized effect.

Volume balancing As you develop a set of patches, you'll probably want them to have similar overall volume levels. Usually the easiest way to adjust this is with the signal processor L parameters. However, when switching output modes, remember that with individual outputs Effect 2 is inactive; this may affect the overall volume.

Creative use of the modulation wheel Just because everyone seems to assign the modulation wheel to LFO amount (for vibrato) doesn't mean you have to be normal. Here are some suggestions on creative mod wheel applications.

- *Crossfading.* Refer to "Other Pressure Tricks" above for the parameter settings, but use Mod Wheel instead of Pressure as the modulator.
- *Bringing in suboctaves.* This is the ticket for monster bass sounds. Assign OSC1 to your primary bass sound and OSC2 to the octave-lower bass sound (you'll probably need to transpose OSC2 down an octave). Set DCA2 to 0 level, modulator to Mod Wheel, and amount to +99. Rotating the mod wheel away from you will bring in the suboctave but not affect the primary bass sound.
- *Tone control.* Use the mod wheel to modulate filter cutoff.
- *"Ganged" parameters.* Remember that you can modulate lots of different things at once — increase filter cutoff, vibrato rate, tremolo amount, or whatever turns you on — by moving the mod wheel.
- *Note* that any of the above applications will also work with footpedal modulation.

Programming a synthesizer can be lots of fun. Go for it! You'll learn a lot about sound in the process, and your programs will reflect your own unique "sonic signature."

Chapter 7 — MIDI Supplement

(This chapter is adapted with permission from *Power Sequencing with Master Tracks Pro/Pro 4* and *The Complete Guide to the Alesis HR-16 and MMT-8*, copyright 1990 and 1989 respectively by AMSCO Publications.)

7.1 MIDI BASICS

Most current electronic instruments, including the DPM V3, contain an internal computer. Computers and music have been working together for decades, which is not surprising considering music's mathematical basis (consider frequencies, harmonics, vibrato rates, tunings, etc.). In the mid-70s, microcomputers became inexpensive enough to be built into consumer-priced musical instruments. They were used for everything from sound generation to storing parameters in memory for later recall.

In 1983, the MIDI (Musical Instrument Digital Interface) specification was introduced to better exploit the computers inside these new musical instruments, primarily to ensure compatibility with equipment from other manufacturers. MIDI expresses musical events (notes played, vibrato, dynamics, tempo, etc.) as a common "language" consisting of standardized digital data. This data can be understood by MIDI-compatible computers and computer-based musical instruments.

Before electronics, music was expressed exclusively as written symbols. By translating musical parameters into digital data, MIDI can express not only the types of musical events written into sheet music, but other parameters as well (such as amount of pitch bend or degree of vibrato).

7.2 MIDI HARDWARE

MIDI-compatible devices usually include both MIDI in and MIDI out jacks, which terminate in 5-pin "DIN" connectors. The MIDI out jack transmits MIDI data to another MIDI device. As you play a MIDI controller such as a keyboard, data corresponding to what you play exits the MIDI out jack. *Example:* If you play middle C, the MIDI out transmits a piece of data that says "middle C is down." If you release that key, the MIDI out transmits another piece of data that says "middle C has been released." If the keyboard responds to the dynamics of your playing, the note data will include dynamics information, too. Moving the modulation wheels and pedals attached to many synthesizers will also generate data associated with the wheel or pedal being used.

The MIDI in jack receives data from another MIDI device. In addition to the type of performance data described above, rhythmically-oriented MIDI devices (e.g., drum machines) can often transmit and/or receive additional MIDI timing messages that keep other rhythmically-oriented units in a system synchronized with each other.

7.6 SYSTEM COMMON MESSAGES

Intended for all units in a system, some of these messages are

Song Position Pointer This indicates how many "MIDI beats" (normally a 16th note) have elapsed since a piece started (up to 16,384 total beats). It is primarily used to allow different sequencers and drum machines to auto-locate to each other so that if you start one sequencer, the other device will automatically jump to the same place in the song, whereupon both continue on together.

System Exclusive This message (called sys ex for short) is considered "exclusive" because different manufacturers send and receive data over MIDI which is intended only for that manufacturer's equipment. *Example:* Sending a Peavey DPM V3 message to an Ensoniq EPS won't do anything, but will be understood by other DPM V3s. This data often contains information about individual instrument patches; some sequencers can record sys ex data in a track, then send it out to re-configure an instrument's patch settings.

Timing Clock The master tempo source (such as a sequencer) emits 24 timing messages per quarter note. Each device synchronized to the sequencer advances by 1/24 of a quarter note when it receives the clock message, thus keeping units in sync after they've both started at the same time.

Start Signals all rhythmically-based units when to start playing.

Stop Signals all rhythmically-based units when to stop playing.

Continue Unlike a Start command, which re-starts a sequencer or drum machine from the beginning of a song each time it occurs, sending a continue message after stop will re-start units from where they were stopped.

7.7 BOOKS ON MIDI

The preceding does not substitute for reading a good book on the subject of MIDI. For further information, refer to the following:

MIDI For Musicians and *The Electronic Musician's Dictionary* by Craig Anderton; AMSCO Publications. The former was written specifically for musicians with no background in MIDI, and the latter defines terms related to musical electronics.

Music Through MIDI by Michael Boom; Microsoft Press. An excellent text for those just getting started with MIDI, synthesis, and related topics.

The Murphy's Law MIDI Book by Jeff Burger; Alexander Publishing. Emphasizes applications and problem-solving.

Using MIDI by Helen Casabona and David Frederick; Alfred Publishing. A general guide to MIDI with an emphasis on applications.

Understanding MIDI and *Understanding MIDI 2* by various authors; Amordian Press. A collection of MIDI-oriented articles from Musician magazine.
These are available from many music and book stores; a mail order source is Mix Bookshelf (800/233-9604).

7.8 MIDI-RELATED MAGAZINES

The following magazines often publish articles that relate to MIDI, as well as related subjects such as synchronization, synthesizers, etc.:

Keyboard (20085 Stevens Creek, Cupertino, CA 95014)
IMA Bulletine (5316 W. 57th St., Los Angeles, CA 90056)
Electronic Musician (6400 Hollis #12, Emeryville, CA 94608)

IMPORTANT SAFETY INSTRUCTIONS

WARNING--When using electric products, basic cautions should always be followed, including the following:

1. Read all safety and operating instructions before using this product.
2. All safety and operating instructions should be retained for future reference.
3. Obey all cautions in the operating instructions and on the back of the unit.
4. All operating instructions should be followed.
5. This product should not be used near water, i.e., a bathtub, sink, swimming pool, wet basement, etc.
6. This product should be located so that its position does not interfere with its proper ventilation. It should not be placed flat against a wall or placed in a built-in enclosure that will impede the flow of cooling air.
7. This product should not be placed near a source of heat such as a stove, radiator, or another heat producing amplifier.
8. Connect only to a power supply of the type marked on the unit adjacent to the power supply cord.
9. Never break off the ground pin on the power supply cord. For more information on grounding, write for our free booklet "Shock Hazard and Grounding."
10. Power supply cords should always be handled carefully. Never walk or place equipment on power supply cords. Periodically check cords for cuts or signs of stress, especially at the plug and the point where the cord exits the unit.
11. The power supply cord should be unplugged when the unit is to be unused for long periods of time.
12. If this product is to be mounted in an equipment rack, rear support should be provided.
13. Metal parts can be cleaned with a damp rag. The vinyl covering used on some units can be cleaned with a damp rag, or an ammonia-based household cleaner if necessary.
14. Care should be taken so that objects do not fall and liquids are not spilled into the unit through the ventilation holes or any other openings.
15. This unit should be checked by a qualified service technician if:
    A. The power supply cord or plug has been damaged.
    B. Anything has fallen or been spilled into the unit.
    C. The unit does not operate correctly.
    D. The unit has been dropped or the enclosure damaged.
16. The user should not to attempt to service this equipment. All service work should be done by a qualified service technician.
17. This product should be used only with a cart or stand that is recommended by the manufacturer.
18. This product, either alone or in combination with an amplifier and headphones or speakers, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at a high volume level or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist.

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THIS LIMITED WARRANTY VALID ONLY WHEN PURCHASED AND REGISTERED IN THE UNITED STATES OR CANADA. ALL EXPORTED PRODUCTS ARE SUBJECT TO WARRANTY AND SERVICES TO BE SPECIFIED AND PROVIDED BY THE AUTHORIZED DISTRIBUTOR FOR EACH COUNTRY.

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PEAVEY ONE-YEAR LIMITED WARRANTY/REMEDY

PEAVEY ELECTRONICS CORPORATION ("PEAVEY") warrants this product, EXCEPT for covers, footswitches, patchcords, tubes and meters, to be free from defects in material and workmanship for a period of one (1) year from date of purchase, PROVIDED, however, that this limited warranty is extended only to the original retail purchaser and is subject to the conditions, exclusions, and limitations hereinafter set forth:

PEAVEY 90-DAY LIMITED WARRANTY ON TUBES AND METERS

If this product contains tubes or meters, Peavey warrants the tubes or meters contained in the product to be free from defects in material and workmanship for a period of ninety (90) days from date of purchase; PROVIDED, however, that this limited warranty is extended only to the original retail purchaser and is also subject to the conditions, exclusions, and limitations hereinafter set forth.

CONDITIONS, EXCLUSIONS, AND LIMITATIONS OF LIMITED WARRANTIES

These limited warranties shall be void and of no effect, if:

a. The first purchase of the product is for the purpose of resale; or
b. The original retail purchase is not made from an AUTHORIZED PEAVEY DEALER; or
c. The product has been damaged by accident or unreasonable use, neglect, improper service or maintenance, or other causes not arising out of defects in material or workmanship; or
d. The serial number affixed to the product is altered, defaced, or removed.

In the event of a defect in material and/or workmanship covered by this limited warranty, Peavey will:

a. In the case of tubes or meters, replace the defective component without charge.
b. In other covered cases (i.e., cases involving anything other than covers, footswitches, patchcords, tubes or meters), repair the defect in material or workmanship or replace the product, at Peavey's option;

and provided, however, that, in any case, all costs of shipping, if necessary, are paid by you, the purchaser.

THE WARRANTY REGISTRATION CARD SHOULD BE ACCURATELY COMPLETED AND MAILED TO AND RECEIVED BY PEAVEY WITHIN FOURTEEN (14) DAYS FROM THE DATE OF YOUR PURCHASE.

In order to obtain service under these warranties, you must:

a. Bring the defective item to any PEAVEY AUTHORIZED DEALER or AUTHORIZED PEAVEY SERVICE CENTER and present therewith the ORIGINAL PROOF OF PURCHASE supplied to you by the AUTHORIZED PEAVEY DEALER in connection with your purchase from him of this product.
If the DEALER or SERVICE CENTER is unable to provide the necessary warranty service you will be directed to the nearest other PEAVEY AUTHORIZED DEALER or AUTHORIZED PEAVEY SERVICE CENTER which can provide such service.

OR

b. Ship the defective item, prepaid, to:

PEAVEY ELECTRONICS CORPORATION
International Servica Center
Highway 80 East
MERIDIAN, MS 39301

including therewith a complete, detailed description of tha problem, together with a legible copy of tha original PROOF OF PURCHASE and a complete return address. Upon Peavey's receipl of lhese items:
If the defect is remedial under these limited warranties and the other terms and conditions expressed herein have been complied with, Peavey will provide the necessary warranty service to repair or replace the product and will return it, FREIGHT COLLECT, to you, the purchaser.

Peavey's liability lo the purchaser for damages from any cause whatsoever and regardless of the form of action, including negligence, is limited to the actual damages up to the greater of $500.00 or an amount equal to the purchase price of the product that caused the damage or that is lhe subject of or is directly related to the cause of action. Such purchase price will be that in effect for lhe specific product when the cause of action arose. This limitation of liability will not apply to claims for personal injury or damage to real property or tangible personal property allegedly caused by Peavey's negligence. Peavey does not assume liability for personal injury or property damage arising out of or caused by a non-Peavey alteration or attachment, nor does Peavey assume any responsbility for damage to interconnected non-Peavey equipment that may result from the normal functioning and maintenance of the Peavey equipment.

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SOME STATES DO NOT ALLOW LIMITATION ON HOW LONG AN IMPLIED WARRANTY LASTS, OR THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU. THESE LIMITED WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY FROM STATE TO STATE.

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Your remedies for breach of these warranties are limited to those remedies provided herein and Peavey Electronics Corporation gives this limited warranty only with respect to equipment purchased in the United States of America.

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1. Mail the completed WARRANTY REGISTRATION CARD to:

PEAVEY ELECTRONICS CORPORATION
POST OFFICE BOX 2898
MERIDIAN, MISSISSIPPI 39302-2898

   a. Keep the PROOF OF PURCHASE. In the event warranty service is required during the warranty period, you will need this document. **There will be no identification card issued by Peavey Electronics Corporation.**
2. IMPORTANCE OF WARRANTY REGISTRATION CARDS AND NOTIFICATION OF CHANGES OF ADDRESSES:
   a. Compiation and mailing of WARRANTY REGISTRATION CARDS — Should notification become necessary for any condition that may require correction, tha REGISTRATION CARD will help ansure that you are contactad and properly notified.
   b. Notice of address changes — If you mova from tha address shown on the WARRANTY REGISTRATION CARD, you should notify Peavey of the change of address so as to facilitate your receipt of any bulletins or other forms of notification which may become necessary in connection with any condition that may require dissemination of information or correction.
3. You may contact Peavey directly by telephoning (601) 483-5365.

DANGER

EXPOSURE TO EXTREMELY HIGH NOISE LEVELS MAY CAUSE A PERMANENT HEARING LOSS. INDIVIDUALS VARY CONSIDERABLY IN SUSCEPTIBILITY TO NOISE INDUCED HEARING LOSS, BUT NEARLY EVERYONE WILL LOSE SOME HEARING IF EXPOSED TO SUFFICIENTLY INTENSE NOISE FOR A SUFFICIENT TIME.
THE U.S. GOVERNMENT'S OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) HAS SPECIFIED THE FOLLOWING PERMISSIBLE NOISE LEVEL EXPOSURES:

DURATION PER DAY IN HOURS	SOUND LEVEL dBA, SLOW RESPONSE
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼ or less	115

ACCORDING TO OSHA, ANY EXPOSURE IN EXCESS OF THE ABOVE PERMISSIBLE LIMITS COULD RESULT IN SOME HEARING LOSS.

EAR PLUGS OR PROTECTORS IN THE EAR CANALS OR OVER THE EARS MUST BE WORN WHEN OPERATING THIS AMPLIFICATION SYSTEM IN ORDER TO PREVENT A PERMANENT HEARING LOSS IF EXPOSURE IS IN EXCESS OF THE LIMITS AS SET FORTH ABOVE. TO INSURE AGAINST POTENTIALLY DANGEROUS EXPOSURE TO HIGH SOUND PRESSURE LEVELS, IT IS RECOMMENDED THAT ALL PERSONS EXPOSED TO EQUIPMENT CAPABLE OF PRODUCING HIGH SOUND PRESSURE LEVELS SUCH AS THIS AMPLIFICATION SYSTEM BE PROTECTED BY HEARING PROTECTORS WHILE THIS UNIT IS IN OPERATION.

CAUTION:

THIS MIXING CONSOLE/EFFECTS DEVICE/SPEAKER HAS BEEN DESIGNED AND CONSTRUCTED TO PROVIDE ADEQUATE SIGNAL (VOLTAGE) FOR PLAYING MODERN MUSIC. IMPROPER USE OF THE GAIN/EQUALIZER CONTROLS AND/OR IMPROPER USE OF INTERNAL/EXTERNAL AMPLIFIERS MAY CREATE CLIPPING (SQUARE WAVES) AND POSSIBLY CAUSE SUBSEQUENT DAMAGE TO THE LOUDSPEAKER SYSTEMS. EXTENDED OPERATION OF THE GAIN/EQUALIZATION CONTROLS IN THEIR MAXIMUM POSITIONS IS THEREFORE NOT RECOMMENDED. PLEASE BE AWARE THAT MAXIMUM POWER CAN BE OBTAINED WITH VERY LOW SETTINGS OF THE GAIN/EQUALIZATION CONTROLS IF THE INPUT SIGNAL IS VERY STRONG.

IT IS COMMON PRACTICE AMONG USERS OF SOUND REINFORCEMENT EQUIPMENT TO IDENTIFY THE INDIVIDUAL CHANNELS WITH A STRIP OF TAPE PLACED ABOVE OR BELOW THE ROW OF VOLUME FADERS. MANY TYPES OR BRANDS OF TAPE HAVE A VERY STRONG ADHESIVE WHICH CAN INHIBIT THE PAINT ON THE FACEPLATE AND ACTUALLY REMOVE THE PAINT WHEN THE TAPE IS REMOVED. WE STRONGLY RECOMMEND THAT SCOTCH TAPE NOT BE USED ON PAINTED SURFACES, NOR ANY OTHER TAPE THAT IS NOT ESPECIALLY DESIGNED FOR SUCH APPLICATIONS. MEDIUM OR LIGHT ADHESIVE MASKING OR PAPER LABEL TAPE IS RECOMMENDED IF TAPE IS USED. ANY TAPE LEFT ON PAINTED SURFACE FOR EXTENDED PERIODS WILL BE DIFFICULT TO REMOVE. NEVER USE CLEAR OR SCOTCH TAPE FOR THESE APPLICATIONS.

1. Read all safety and operating instructions before using this product.
2. All safety and operating instructions should be retained for future reference.
3. Obey all cautions in the operating instructions and on the back of the unit.
4. All operating instructions should be followed.
5. This product should not be used near water, i.e. a bathtub, sink, swimming pool, wet basement, etc.
6. This product should be located so that its position does not interfere with its proper ventilation. It should not be placed flat against a wall or placed in a built-in enclosure that will impeda tha flow of cooling air.
7. This product should not be placed naar a source of heat such as a stove, radiator or another heat producing amplifier.
8. Connect only to a power supply of the type marked on the unit adjacent to tha powar supply cord.
9. Never break off the ground pin on the power supply cord. For more information on grounding write for our free booklet "Shock Hazard and Grounding."
10. Power supply cords should always be handled carefully. Never walk or placa equipment on power supply cords. Periodically check cords for cuts or signs of stress, aspacially at the plug and the point where the cord exits tha unit.
11. The power supply cord should be unplugged when the unit is to be unused for long pariods of time.
12. If this product is to be mounted in an equipment rack, raar support should be provided.
13. Metal parts can be cleaned with a damp rag. The vinyl covering used on some units can be cleaned with a damp rag, or an ammonia based household cleanar if necessary.
14. Care should be taken so that objects do not fall and liquids ara not spilled into the unit through the ventilation holes or any other openings.
15. This unit should be checkad by a qualified servica tachnician if:
    A. The power supply cord or plug has been damaged.
    B. Anything has fallen or been spilled into the unit.
    C. The unit does not operate correctly.
    D. Tha unit has been dropped or the enclosura damagad.
16. The user should not to attempt to service this equipment. All service work should be done by a quallfied service technician.

Chapter 6 — Advanced Applications

Now that we've covered the basics, it's time to get into some advanced applications and techniques.

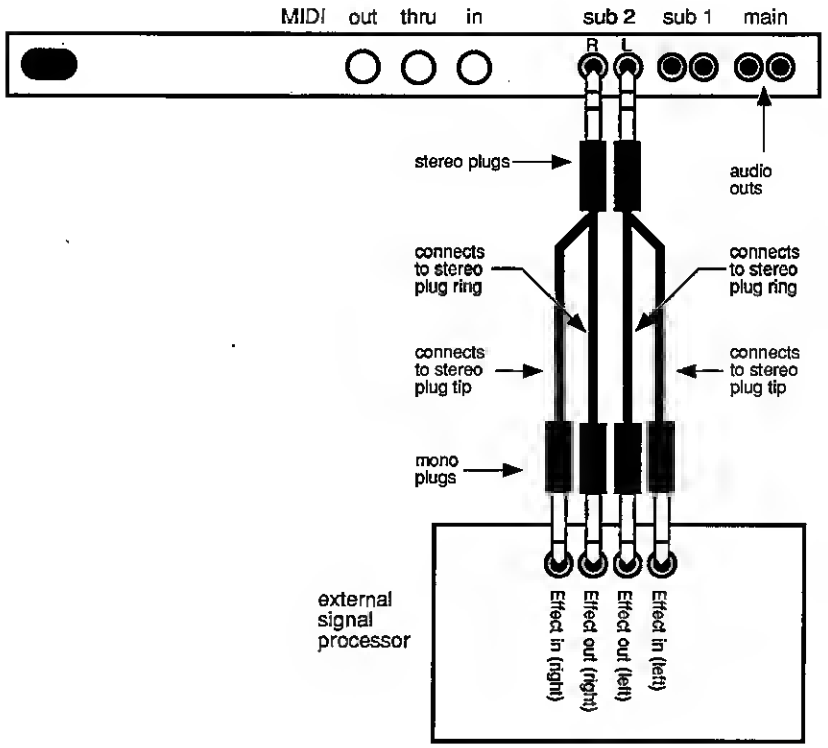
6.1 MAKING THE MOST OF THE SIX OUTPUTS

The six outputs are very flexible. Some of the options are:

- Three individual stereo outputs. In a Multi setup, assign each of three sounds to its own set of outputs.
- Six individual mono outputs. In a Multi setup with six sounds, pan sound #1 full right and sound #2 full left, then assign these to output pair 1+2. Pan sound #3 full right and sound #4 full left, then assign these to output pair 3+4. Pan sound #5 full right and sound #6 full left, then assign these to output pair 5+6. Each sound will now appear over its own output jack.
- Combinations of stereo and mono outputs. Combine the two approaches above to create both stereo and some mono outputs.

The Sub output jack pairs are wired so that you can hook up external signal processors to signals assigned to output pair 3+4 (sub 1) and 5+6 (Sub 2). Each output pair goes through its own signal processor before being routed back to the DPM V3; their outputs then show up over the Main outputs (1+2).

The secret to all this is that the sub outputs are wired in a tip/ring/sleeve configuration. The tip provides the signal output; the ring provides a signal return that feeds the main mixer (which terminates in outputs 1+2). The following diagram shows how signals would be routed so that Sub 2 is processed through an external stereo signal processor.



An optional MIDI thru jack provides a duplicate of the signal at the MIDI in jack. This is handy if you want to route MIDI data appearing at one device to another device as well.

Example: Suppose the MIDI out from a MIDI keyboard such as the DPM 3 feeds the DPM V3's MIDI in. Patching the DPM V3's MIDI thru to a second DPM V3 sends the DPM 3's MIDI signal "thru" to the second DPM V3. Thus, playing on the DPM 3 will trigger both DPM V3s.

7.3 ABOUT SEQUENCING

The DPM V3 was designed for several applications, including being driven by a sequencer as a multi-timbral sound expander module. To understand this application, it's necessary to look a bit into how sequencing works.

Sequencing, the computerized equivalent of tape recording, is a very common and popular MIDI application. There are two main types of sequencers: dedicated hardware units and software-based sequencer programs that run on a computer. At present, only the Atari ST series and Yamaha C1 computers have built-in MIDI connections, but other computers can hook up to a "black box" called a MIDI interface, which converts MIDI data into a format the computer can understand. This allows the computer to control a group of MIDI instruments.

Sequencing takes advantage of the fact that MIDI data can correlate exactly to a performance on a MIDI instrument. Suppose we feed this performance data to a computer's MIDI in jack, and load the computer with a program that instructs the computer to remember the order in which data appeared at the MIDI in jack. The computer acts like a recorder, but instead of recording audio, it stores digital data that represents the notes you played, and the exact order in which you played those notes.

If you play a chord, each note in the chord results in a discrete piece of data. These pieces of data, like all MIDI data, are sent serially (i.e., one right after the other). Fortunately, this happens at a very high rate so that notes played at the same time appear to occur simultaneously, even if a few milliseconds elapse between the first and last notes of the chord.

Once stored in memory, connecting the computer's MIDI out to the instrument's MIDI in recreates the performance. The principle is the same as a player piano, but instead of having keys triggered by holes in a roll of paper, electronic sounds within the keyboard are triggered by data contained in the computer's memory. This underscores the importance of a standardized specification, since any MIDI-compatible device can accept data from the computer. If the sequencer says "play middle C,"

the sound generator will play middle C, regardless of the manufacturer. However, note that not all instruments implement all aspects of the MIDI specification.
Example: Not all instruments send or receive keyboard pressure data.

Each of MIDI's 16 available channels can carry a unique set of MIDI data. Since all this data travels over one cable, each piece of data includes its appropriate channel ID so that MIDI receivers can "tune in" to a particular channel and accept only that data. The DPM V3's Multi mode allows different sounds to be tuned to different channels for this purpose.

A keyboard transmitting over channel 2 will stamp all its data as belonging to channel 2. This is particularly helpful when sequencing, since each recorded "track" can be assigned to a unique MIDI channel, and the associated pieces of gear can tune in to a particular track. *Example:* If track 1 (set to MIDI channel 1) carries bass and track 2 (set to MIDI channel 2) contains drum data, you would tune a bass sound generator to receive the data on track 1 and the drum machine to receive the data on track 2.

7.4 MIDI MESSAGE BASICS

The are two main types of MIDI messages. Channel messages, which are channel-specific, consist of Voice and Mode messages. System messages, which do not have a channel number and are received by all units in a system, include Common, Real Time, and Exclusive messages.

7.5 CHANNEL MESSAGES

7.5a Voice messages

A synthesizer's voice is the most basic unit of sound generation. Usually, each voice plays one note at a time (although a DPM V3 voice can consist of two oscillators), so the number of notes you can play at one time will be limited by the available number of voices. MIDI messages that affect voices include:

Note On Corresponds to a key being pressed down; values range from 000 (lowest note) to 127 (highest note). Middle C is 60.

Note Off Corresponds to a key being released; values are the same as note on.

Velocity Corresponds to dynamics; values range from 001 (minimum velocity) to 127 (maximum velocity). A velocity of 000 is equivalent to a note-off message.

Pressure Indicates the pressure applied to a keyboard after pressing a key; typically used to introduce vibrato, open a filter, etc. There are two kinds of pressure. Mono (or channel) pressure represents the average pressure of all keys held down, whereas

polyphonic pressure sends out data for each individual key being pressed down. The DPM V3 responds to Mono pressure only. Values range from 000 to 127.

Program Change Sending a program change command from a sequencer or other MIDI keyboard can change synth patches automatically. There are 128 program change command numbers.

Pitch Bend This "bends" a note from its standard pitch, which is excellent for creating lead guitar effects. The degree of response to pitch bend sensitivity is adjustable for each DPM V3 program, but to prevent confusion you might want to set them all to the same value.

Continuous Controller Footpedals, breath controllers, and modulation wheels can vary sounds as you play, thus adding expressiveness. MIDI allows for 64 continuous controllers (these act like potentiometers in that you can choose one of many different values) and 58 switch controllers (these choose between two possible states, such as on/off). Each type of controller is stamped with its own controller identification number. Not all controller numbers have been standardized for specific functions, but the following indicates the current list of assigned controllers. Numbers in parenthesis indicate the controller range.

1 Modulation Wheel (0-127)
2 Breath Controller (0-127)
3 Early DX7 Aftertouch (0-127)
4 Foot Controller (0-127)
5 Portamento Time (0-127)
6 Data Slider (0-127)
7 Main Volume (0-127)
8 Balance (0-127)
10 Pan (0-127)
11 Expression (0-127)
16 General Purpose #1 (0-127)
17 General Purpose #2 (0-127)
18 General Purpose #3 (0-127)
19 General Purpose #4 (0-127)
32-63 Least Significant Bits, Controllers 0-31 (0-127; not often used and therefore not accessible from the DPM V3)
64 Sustain Pedal (0 or 127)
65 Portamento On/Off (0 or 127)
66 Sustenuto Pedal (0 or 127)
67 Soft Pedal (0 or 127)
69 Hold 2 (0 or 127)
80 General Purpose #5 (0 or 127)
81 General Purpose #6 (0 or 127)
82 General Purpose #7 (0 or 127)
83 General Purpose #8 (0 or 127)
92 Tremolo Depth (0-127)
93 Chorus Depth (0-127)
94 Celeste Depth (0-127)
95 Phase Depth (0-127)
96 Data Increment (0 or 127)
97 Data Decrement (0 or 127)
98 Non-Registered Parameter MSB (0-127)
99 Non-Registered Parameter LSB (0-127)
100 Registered Parameter MSB (0-127)
101 Registered Parameter LSB (0-127)
121 Reset All Controllers (0)
122 Local Control On/Off (0 or 127)
123 All Notes Off (0)
124 Omni Off (0) 125 Omni On (0)
126 Mono On (0-16; 0=Omni Off)
127 Poly On (0)

7.5b Mode messages

There are two messages that determine the MIDI mode (i.e., how devices will receive MIDI data). The "omni" message determines how many channels will be recognized. Omni on means that data from all channels will be received; Omni off limits the number of channels, usually to one.

The "mono/poly" message deals with voice assignment within the synthesizer. In Mono mode, only one note at a time plays in response to voice messages; in Poly mode, as many voices can play notes as are available to play notes.

Using these two messages in various combinations produces the following mode messages.

Omni On/Poly (Mode 1) The synthesizer's voices respond to voice messages occuring on any channel.

Omni On/Mono (Mode 2) This mode is seldom implemented because playing one note out of the data occurring on all 16 channels is not very useful.

Omni Off/Poly (Mode 3) In this extremely common mode, the DPM V3 is tuned to a single channel; any incoming messages are assigned to synth voices, up to the maximum number of 16 voices.

Omni Off/Mono (Mode 4) Voice messages are received over several channels, but each channel plays monophonically. In other words, you could play one voice on channel 1, one voice on channel 2, etc. The DPM V3 implements an improved version of Mono mode called dynamic allocation, which lets the synth receive polyphonic data over each channel.

7.5c Other messages

Local Control On/Off This is used with keyboards that also include built-in sound generators. With Local Control on, playing the keyboard triggers the internal voices and sends data out the MIDI out jack. With Local Control off, the controller data does not trigger the internal voices, but does send data out MIDI out. The Instruments window allows you to send Local Control off/on messages directly from Beyond. The main use for Local Off is to play an expander module from a master keyboard, but not trigger the internal sounds.

All Notes Off This command, if recognized by the receiver, will turn off any "stuck" notes. These usually occur when a device receives a note on message, but for whatever reason (e.g., someone tripping over a patch cord) doesn't receive the corresponding note off command.